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ABSTRACT

This monograph is part of a study to collect "benchmark" data on the teaching of science that could serve as a basis of comparison for trend analysis. The information obtained in this survey provides a description of science teaching practices and selected teacher characteristics in the United States. The purpose of this study was to obtain information about procedures, practices, policies and conditions related to the teaching of science in the public elementary schools of the United States in 1971. This monograph provides results of correlation and multiple regression analyses of selected elementary school and teacher variables. (BT)

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SCIENCE EDUCATION INFORMATION REPORT

THE ERIC SCIENCE, MATHEMATICS AND ENVIRONMENTAL EDUCATION CLEARINGHOUSE
in cooperation with
Center for Science and Mathematics Education
The Ohio State University

SCIENCE EDUCATION REPORTS

BY

Robert L. Steiner
Arthur L. White
Robert W. Howe
Jerrold W. Maben
Bessie E. Nelson
Melvin R. Webb

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Preface

The purpose of this study was to collect "bench mark" data on the teaching of science that could serve as a basis of comparison for trend analysis. The information obtained in this survey provides a description of science teaching practices and selected science teacher characteristics in the United States. Comparisons with data to be obtained in future studies will help decision makers regarding changes taking place in programs, instruction, facilities and teacher education.

This monograph provides results of correlation and multiple regression analyses of selected elementary school and teacher variables. It is a companion to Volume 3 which provides descriptive information on the teaching of elementary school science obtained in the survey. Both of these volumes utilize and consolidate regional data collected in individual doctoral studies by Maben (1971), Webb (1972) and Nelson (1973). A similar pair of monographs provides descriptive and correlation and multiple regression results regarding the teaching of secondary school science.

This trend analysis project will be continued by another national survey. We have used information obtained in the 1970-71 survey to answer many requests for information at ERIC/SMEAC and believe there is interest and need for similar information collected on a periodic basis.

The authors are grateful for assistance provided by James Kozlow and Edith Santana. The computer data analyses provided by Mr. Kozlow and Mrs. Santana provided considerable assistance in preparing the final report.

Robert W. Howe
Director
ERIC/SMEAC

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Introduction

A national survey of science teaching was conducted by the Faculty of Science and Mathematics at The Ohio State University during the 1970-71 school year. The purpose was to establish a data bank of information concerning science teaching in the public schools in the fifty states of the United States and the District of Columbia.

The survey was designed to collect data from a sample of public schools in all states and the District of Columbia. The data were organized by regions which were based on the divisions formulated in the Brown and Obourn study of 1963 (Chin, 1971). The regions included were: Great Lakes, Farwest, New England, Mideast, Southwest, Rocky Mountains, Plains, and Southeast.

A unique feature of the survey was the procedures used to select the sample schools from the population of public elementary and secondary schools. Sampling techniques were used which insured that the ratio of the enrollments of schools sampled per region to the total enrollment of schools sampled was the same as the ratio of the regional population enrollments to the total school population enrollments.

Sampling Procedures

The sampling procedure for this study consisted of three stages.

- Stage I: the random selection of public elementary schools
- Stage II: the random selection of elementary school teachers who taught at least one class of science
- Stage III: the random selection of elementary school science classes.

Figure 1 gives a flow chart of the sampling design indicating the three stages. Each stage is described below.

Selection of Public Elementary Schools

This study was part of a national study of both elementary and secondary schools. The size of the samples for these two studies was to reflect the ratio of the total enrollment in elementary schools to the total enrollment in secondary schools. For design purposes, a figure of 10,000 schools was set for the sample size for the elementary study. The secondary school sample consisted of 6,398 schools.

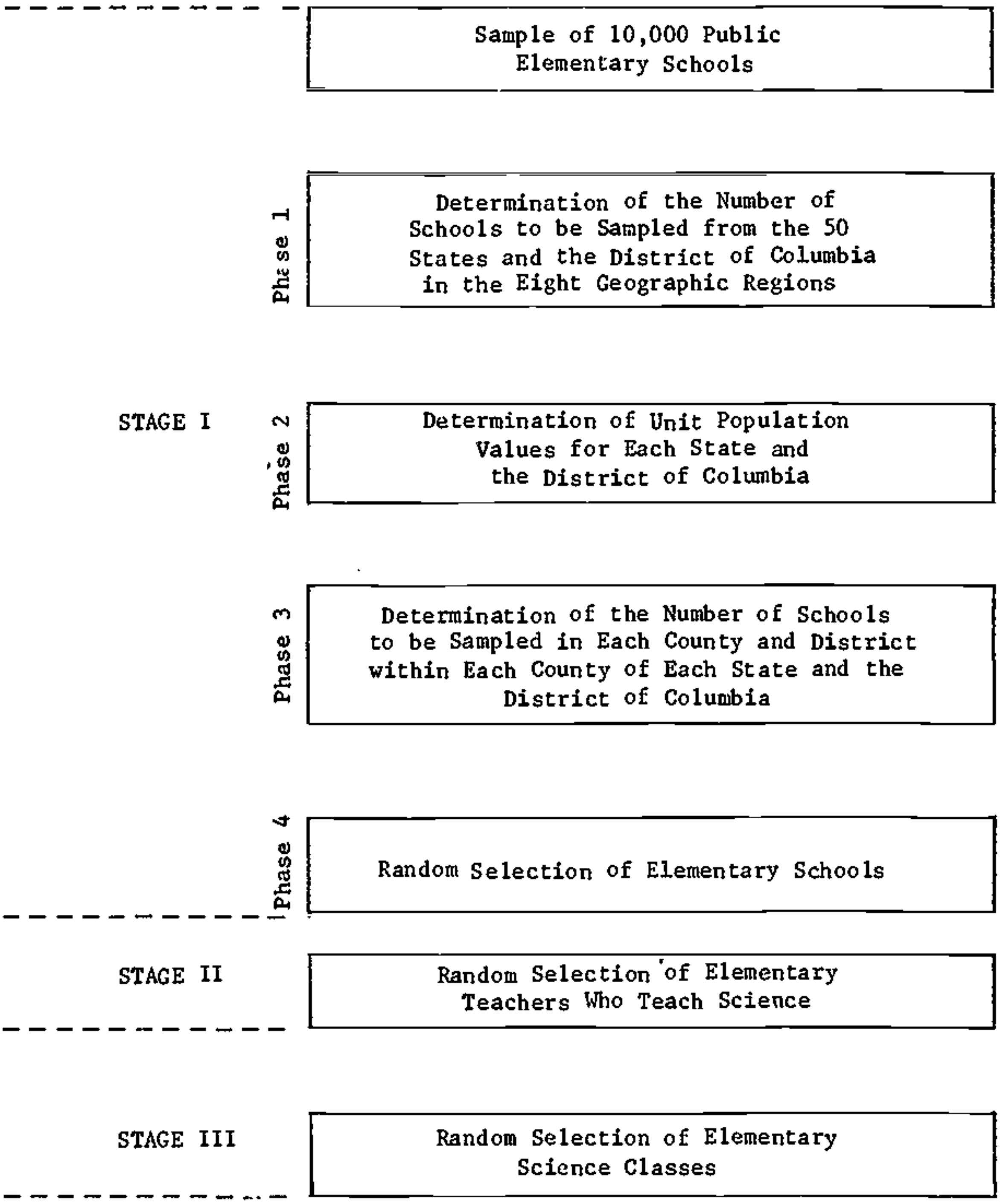

Figure 1. The Stages of the Sampling Design.

In Phase 1 of Stage I, the number of schools to be sampled within each state was computed as a ratio of the total elementary enrollment of a given state to the total U.S. elementary school enrollment as given by Kahn and Hughes (1969) and adjusted by use of state school directories for all states to get a more accurate enrollment for the 1969-1970 school year.

Thus,

$$n_{state} = \frac{N_{state\ (E)}}{N_{total\ (E)}} \times N$$

where n_{state} = the number of public elementary schools to be sampled within a state

$N_{state(E)}$ = the total elementary school enrollment in a state

$N_{total(E)}$ = the total U. S. elementary school enrollment

N = the national study sample size (10,000 elementary schools)

Example: State of Oklahoma

The number of schools to be sampled from Oklahoma is calculated below as an example.

$$N_{Okla.} = \frac{N_{Okla.(E)}}{N_{total\ (E)}} \times N$$

where $N_{Okla.(E)}$ = 296,118 elementary school students

$N_{total(E)}$ = 27,418,423 elementary school students

Therefore,

$$n_{Okla.} = \frac{296,118}{27,418,423} \times 10,000 = 108$$ public elementary schools to be sampled within Oklahoma

By use of this procedure, the number of schools sampled in each state and the District of Columbia was a function of the reported total state elementary school enrollment and not biased by variation in school building enrollments. This insured that the state which had the greatest total enrollment of elementary school students had the largest number of schools in the sample.

Unit population values were calculated in Phase 2 of Stage I of the sampling procedure for each state and the District of Columbia. These values were used to choose appropriate numbers of schools from the educational units making up the state structures. The numerical value for the unit population for each state in this study was the ratio of the state's total elementary and secondary school enrollment to the sample size of that state.

Hence:

$$\text{Unit population for a given state} = \frac{N_{\text{state (E,S)}}}{n_{\text{state}}}$$

where $N_{\text{state (E,S)}}$ = the total elementary and secondary school enrollment for the state

It can be noted that the unit population values were calculated by use of the total elementary and secondary school student enrollment. Two reasons for use of such a method are: 1) some data on some districts give only combined enrollments and 2) there tends to be variations among states as to what grades constitute elementary and what grades constitute secondary enrollments. The method employed in this study tends to insure uniformity in sampling procedures.

As a consequence of this sampling method, some state sample sizes may be slightly weighted in the direction of those educational units which contain a larger proportion of secondary to elementary students. Thus some districts which have higher retention powers for students may contain more schools in the sample than actually should be contained in it.

With Oklahoma used as an example, the following calculations are made to determine the unit population to be used when choosing schools for the sample from Oklahoma educational units.

$N_{\text{Okla. (E,S)}}$ = 522,000 elementary and secondary students in Oklahoma

$n_{\text{Okla.}}$ = 108 public elementary schools to be in the sample from Oklahoma

$$\text{Unit population for Okla.} = \frac{522{,}000}{108} = 4{,}832$$ students represented by each school chosen in the sample from Oklahoma

This simply means that one elementary school was sampled from the state of Oklahoma from every 4,832 students at the secondary and elementary level.

By similar methods for each state and the District of Columbia, unit population values were calculated.

Phase 3 of Stage I sampling procedure involved employing a means of computing the number of schools to be sampled from educational units of counties, districts, or groups of such units within states. The following procedures were used to calculate the number of schools to be included in the sample from each of the counties of each state.

1. After grouping school districts by county, the total elementary and secondary school enrollment of each county was divided by

the unit population of the state containing the county. This gave the number of schools to be sampled from the county.

Example:

Total elementary and secondary school enrollment for Tulsa County in Oklahoma	= 96,739
Unit population for Oklahoma	= 4,832
Number of public elementary schools to be sampled from the population of public elementary schools in Tulsa County in Oklahoma	$= \frac{96,739}{4,832}$
	= 20 (to the nearest whole number).

2. If the total elementary and secondary school enrollment of a <u>county</u> was less than one-half the unit population for the state containing the county, one or more adjacent counties were combined with the given county so that the total combined school enrollment was greater than one unit population for the state. This combined-county enrollment was divided by the state unit population to give the number of elementary schools to be chosen from these combined-counties.

Example:

Total elementary and secondary school enrollment for Craig County in Oklahoma	= 1,984
Total elementary and secondary school enrollment for Nowata County in Oklahoma	= 1,026
Total enrollment for both Craig and Nowata Counties in Oklahoma	= 3,010
Number of public elementary schools to be sampled from the population of public elementary schools in Craig and Nowata Counties	$= \frac{3,010}{4,832}$
	= 1 (to the nearest whole number)

3. To determine the number of schools to include in the sample from the large school districts within each county, the total school enrollment of each district was divided by the unit population of the state in which the district was located.

Example:

Total school enrollment for Tulsa City School District (a large district) in Tulsa County in Oklahoma = 79,530

Number of public elementary schools to be sampled from Tulsa City School District $= \frac{79,530}{4,832}$

= 16 (to the nearest whole number)

4. If a school <u>district</u> in a county had a school enrollment of less than one-half the unit population for the state, the <u>district</u> was combined with one or more adjacent <u>districts</u> in the county to give a combined enrollment of one or more times the unit population.

Example:

Total school enrollment for Jenks School District in Tulsa County in Oklahoma = 1,530

Total school enrollment of Owasso School District in Tulsa County in Oklahoma = 1,870

Combined school enrollment for Jenks and Owasso School Districts = 3,400

Number of public elementary schools to be sampled from Jenks and Owasso School Districts $= \frac{3,400}{4,832}$

= 1 (to the nearest whole number)

After the number of schools to be sampled from each district or combination of districts was determined, the corresponding number of schools was randomly selected. This procedure comprised Phase 4 of Stage I of the sampling procedure. Schools in a district or combination of districts were alphabetized and numbered from 1 to "N" where "N" represented the last school in the district list. A table of random numbers was then used to select the schools for the sample. The random numbers selected corresponded to the respective numbers assigned to the schools in the alphabetic list of schools in the district. Random numbers and corresponding schools were selected until the previously determined number of schools was selected. These schools made up the sample for the given district or districts.

A pack t containing a letter addressed to the principal, the Principal's Questionnaire, a letter addressed to an elementary school teacher, the Elementary Teacher Questionnaire, and a self-addressed, prepaid, return envelope was mailed to the principal of each selected school.

Selection of Elementary Science Teachers

The principal was to complete and return the Principal's Questionnaire and to randomly select a teacher to complete the Elementary Teacher Questionnaire. The principals were given specific directions on how to randomly select a teacher from an alphabetical listing of all full- and part-time teachers in their respective schools (Nelson, 1973). The teacher was to complete the Elementary Teacher Questionnaire and either return it to the principal or directly to The Ohio State University in the pre-addressed envelope provided.

Selection of Elementary Science Classes

The teacher who was randomly selected by the principal to complete and return the Elementary Teacher Questionnaire was asked to randomly select a science class, if appropriate, in order to provide data requested on the questionnaire. Specific directions were provided to assist the teacher in this selection (Nelson, 1973). In schools which used a self-contained classroom organization and the teacher taught only one class of science, the teacher would then provide the questionnaire data based on the single class.

Questionnaires were sent to both the school principal and a science teacher on the staff so that relationships between organization variables and teaching practices could be made. Communications were received from a teacher or a principal from approximately 95 percent of the schools. In the analysis of the questionnaire data for this report only schools from which both the teacher and principal questionnaires were returned are included in the analysis. In a number of cases either the principal or teacher questionnaire was returned, but not both, thus reducing the number of questionnaires included in the analysis. Late returns from approximately 400 schools were compared to the total sample (by item) and did not deviate by more than one percent, hence the data used by the doctoral students was not augmented by the other data for this report. Small state data might change by inclusion of other data, but there was no intent to analyze individual states. The number of principal-teacher questionnaire pairs used for analysis ranged by region from 23 to 42 percent and was 28 percent for the total sample. A summary of the sampling information for this study is included in Table 1.

Effect of Non-response and Incomplete Questionnaires on Analysis

Several analyses were conducted to determine the possible effect of non-responses and the removal of questionnaires from the analyses.

Analyses were conducted to determine which schools did or did not respond and the possible impact of those schools on the analyses. The analyses were conducted in three ways: (1) determining whether non-responding schools differed from those that did respond regarding school size, school location, and type of school; (2) analyzing principal and teacher returns from schools with a single response to compare data from those with two responses; and (3) checking non-responding schools in detail in two states (Ohio and Oregon) and a sample of 30 other schools from other states.

Analyses of data by regions indicated no significant differences using X^2 (.05 level) between non-responders and responders on items checked. Analyses of non-responders in two states and a sample of 30 schools selected from other states indicated non-responders would have little if any impact on the regional data. Data for small states would change, but these changes would not have substantial impact on regional or national data.

TABLE 1

SUMMARY STATISTICS FOR REGIONAL AND STATE ELEMENTARY SCHOOL POPULATION, SAMPLE AND RESPONSE RATE

Region	Population	Sample	Unit Population	Questionnaire Sets Used in Analysis	Percentage of Sample Schools
Great Lakes					
Illinois	3293	537	4233		
Indiana	1690	245	4919		
Michigan	2687	437	4859		
Ohio	3187	621	3839		
Wisconsin	1777	207	4609		
	12634	1964		543	28
Farwest					
Alaska	300	17	4204		
California	5465	1025	4342		
Hawaii	161	38	4784		
Nevada	178	26	4547		
Oregon	970	112	3982		
Washington	1158	160	4933		
	8232	1378		313	23
New England					
Connecticut	880	142	4214		
Maine	731	57	3805		
Massachusetts	1831	225	4836		
New Hampshire	361	27	4553		
Rhode Island	270	35	4686		
Vermont	338	17	4745		
	4480	503		145	29
Mideast					
Delaware	146	24	4794		
District of Columbia	143	33	4382		
Maryland	971	172	4744		
New Jersey	1921	329	4168		
New York	3274	684	4817		
Pennsylvania	3359	437	5021		
	9814	1679		462	28
Southwest					
Arizona	582	99	3878		
New Mexico	490	50	4955		
Oklahoma	1194	117	4832		
Texas	3414	500	4916		
	5680	766		206	27
Rocky Mountains					
Colorado	797	110	4766		
Idaho	376	34	5261		
Montana	792	40	4319		
Utah	397	62	4856		
Wyoming	301	17	5059		
	2663	263		110	42
Plains					
Iowa	1292	170	3869		
Kansas	1326	135	3860		
Minnesota	1671	178	5029		
Missouri	1642	286	3296		
Nebraska	2003	70	4695		
North Dakota	609	35	4256		
South Dakota	1308	34	4917		
	9851	908		282	31
Southeast					
Alabama	1247	164	5071		
Arkansas	827	91	4981		
Florida	1368	274	4948		
Georgia	1549	261	4227		
Kentucky	1320	164	4260		
Louisiana	1262	192	4593		
Mississippi	805	124	4691		
North Carolina	1691	310	3855		
South Carolina	954	144	4504		
Tennessee	1450	207	4268		
Virginia	1464	236	4472		
West Virginia	1136	83	4935		
	15073	2250		614	27
Total U.S.	68427	9711		2675	28

Design of the Study

The purpose of the over-all national survey was to obtain descriptive information concerning the practices, procedures, policies and conditions related to the teaching of science in the public schools of the United States as they existed during the 1970-71 school year. Two studies were conducted concurrently. One was at the elementary level and the companion study at the secondary level to provide K-12 data. This report deals with the elementary level data collected from the principals and teachers of the schools and is a followup and extension of the descriptive report (Howe, et al., 1976). Included is a discussion of the correlational analysis of the data derived from the principal's and teacher's questionnaires.

The population for this survey included the 68,427 public elementary schools in the 50 states and the District of Columbia as listed by Gertler (1970). A sample of 10,000 public elementary schools was decided upon to be used in the study. The sample of 10,000 public elementary schools represented 14.6 percent of the public elementary schools in the United States (Kahn and Hughes, 1969). Since questionnaires from 28 percent of the sample schools were used for this report, the data upon which this report is based is from 4.1 percent of the public elementary schools in the United States and the District of Columbia during the 1970-71 school year.

Figure 2 represents the geographic distribution of the public elementary schools sampled per state for the survey.

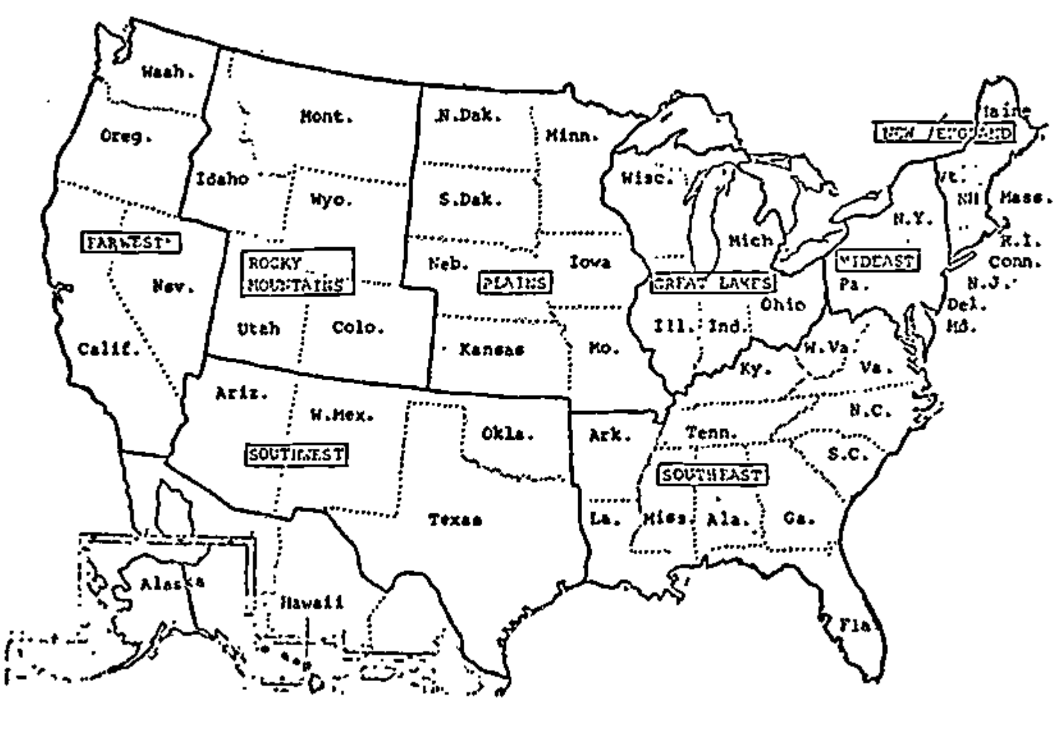

Figure 2. State Groupings

The states included in each of the regions are as follows:

Great Lakes:	Illinois, Indiana, Michigan, Ohio, Wisconsin
Farwest:	Alaska, California, Hawaii, Nevada, Oregon, Washington
New England:	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
Mideast:	Delaware, District of Columbia, Maryland, New York, New Jersey, Pennsylvania
Southwest:	Arizona, New Mexico, Oklahoma, Texas
Rocky Mountains:	Colorado, Idaho, Montana, Utah, Wyoming
Plains:	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
Southeast:	Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, West Virginia, Virginia

Data-Gathering Instruments

The data were gathered by means of two structured questionnaires, the Principal's Questionnaire and the Elementary Teacher Questionnaire (Appendices A and B). The Principal's Questionnaire was designed to provide data for all elementary teachers and classes in each of the selected schools. The instrument included 23 items grouped into the following seven categories.

1. Screening
2. School Organization and Scheduling
3. Science Instruction Pattern
4. Teaching Staff
5. Science Budget
6. Course Offering in Science
7. Miscellaneous

The Elementary Teacher Questionnaire was designed to provide information about specific characteristics of teachers who taught elementary school science as well as the conditions under which science instruction took place and the approaches used during instruction. This questionnaire included 19 items grouped into the following five categories.

1. Teacher Characteristics
2. Elementary Science Teaching
3. Special Science Facilities
4. Audio-Visual Aids
5. Miscellaneous

The responses from the two questionnaires were pooled and provided raw data on 623 variables. In addition, 85 variables were transgenerated from collapsing or combining categories in the original data. This brought the total number of variables to 708. Not all of the variables were used in the correlational and regression analyses. Some of the variables were nominal, some resulted in 75 to 100 percent agreement of the subjects responding in the same manner, some were not of particular interest and some resulted in ambiguous responses due to misinterpretation by the respondents. One hundred and forty-three of the variables were selected for the correlational analysis and, of these, eighty-five were used in the regression analysis. Variables which were left blank by more than 10 percent of the respondents were not included in the regression analysis. Table 2 summarizes the source and number of variables included in the total study (descriptive and correlational) and specifically those included in the correlation and regression analysis.

TABLE 2

SOURCE AND NUMBER OF VARIABLES INCLUDED IN ELEMENTARY STUDY AND ANALYSIS

	Variables Used in Analysis							
	Questionnaire		Correlation Analysis		Regression Analysis		Dependent	
	Principal	Teacher	Principal	Teacher	Principal	Teacher	Principal	Teacher
Original	463	160	35	56	20	45	4	7
Generated	80	5	47	5	15	5	6	3
Totals	543 (708)	165	82 (143)	61	35 (85)	50	10 (20)	10

A listing of the 85 variables included in the regression analysis is given in Table 3. These variables can be grouped into the following six broad categories.

A. School organization, scheduling and enrollment variables (1,2,10,21,31,33-35)

B. Resource variables (3-9,12,14,22,28,30,43,44)

C. Science Course Improvement Project variables (23-27,81,82)

D. School curriculum and materials variables (11,13,29,32,61-66)

E. Teacher characteristics and background variables (36-42,84,85)

F. Teacher practices, preferences and concerns variables (15-20,45-60,67-80, 83)

The means, standard deviations, and number of responses for each of these categories of variables are given in Tables 4-9.

TABLE 3

ELEMENTARY SURVEY VARIABLES INCLUDED IN REGRESSION ANALYSIS

	Variable	Scoring
1	Total School Enrollment	Number
2	[illegible] for [illegible] Science	2 Yes, 1 No
3	Annual Budget for Science [illegible]	
4	Annual Budget for Science [illegible]	
5	Ability to [illegible] Science [illegible] & Supplies	
6	Availability of [illegible]	3 Adequate to 1 Lacking
7	Availability of [illegible]	
8	Availability of [illegible]	
9	Availability of [illegible]	
10	Special [illegible] in Science	2 Yes, 1 No
11	Environmental [illegible]	
12	Special Facilities for [illegible] Education	
13	Drug or [illegible] Education	
14	Consultant or Supervisory Help in Teaching Science	
15	Attend [illegible] Sections	
16	Attend Curriculum Development & Revision	
17	Attend Elementary Science Courses	
18	Attend Elementary Science [illegible]	
19	Attend Visitation & Demonstration Teaching	
20	Attend Television and Radio Programs	
21	Total Teachers Per Student	Number
22	[illegible] Funds for Remodeling or Purchases	1 Yes, 0 No
23	SCIS	
24	ESS	
25	S-APA	
26	Other SCIP	
27	Any SCIP	
28	Special Science Facilities in School	
29	[illegible] in School	
30	Outside Help [illegible] School	
31	Non-Graded [illegible] School	
32	TV Science Program in School	
33	School Type I	
34	School Type IV	
35	School Type V	
36	Sex of Teacher	2 Male, 1 Female
37	Number Years of Elementary School Teaching	Number
38	Number of Years of [illegible] Science	
39	Number of Years at Present School	
40	Master's Degree	2 Yes, 1 No
41	Working on Master's Degree	
42	Hours of Mathematics at University	Number
43	Adequacy of Supplies	3 Adequate to 1 Lacking
44	Adequacy of Equipment	

	Variable	Scoring
45	Use of Motion Picture Projector	3 Often to 1 Rarely
46	Use of Overhead Projector	
47	Use of [illegible]	
48	Lack Room Facilities	3 Great Difficulty to 1 No Difficulty
49	Lack Supplies and Equipment	
50	Lack Funds	
51	Lack [illegible] Support	
52	Inability of Teacher to Improvise Materials	
53	Lack Science Knowledge	
54	Lack Science Methods	
55	Lack Consultant Support	
56	Lack Teacher Interest	
57	Scope and Sequence Undefined	
58	Low Importance Placed on Science	
59	Lack Time	
60	Lack In-Service Opportunities	
61	Single Textbook Including Lab Manual	1 Yes, 0 No
62	Locally Prepared Materials	
63	Single Textbook	
64	Separate Textbook	
65	Multiple Textbooks Including Lab Manuals	
66	Multiple Textbooks	
67	Use of Lecture	4 Most Often to 0 Not Used
68	Use of Individual Laboratory Activities	
69	Use of Lecture-Discussion	
70	Use of Group Laboratory Activities	
71	Use of Small Group Discussion	
72	Use of In-Class Written Assignments	
73	Use of Science Demonstrations	
74	Use of Excursions or Field Trips	
75	Use of Instructional Films	
76	Use of Programmed Instruction	
77	Use of Independent Study	
78	Use of Auto-Tutorial Instruction	
79	Use of Televised Instruction	
80	Satisfaction With Teaching Science	5 Very Satisfied to 1 Very Dissatisfied
81	Teach any NSF Curriculum Projects	1 Yes, 0 No
82	Attend any NSF Curriculum Project Workshops	
83	Teacher's Role in Representative Class	2 Helps, 1 No Help
84	Total Hours of Science at University	Number
85	Total Hours Science Student Teaching & Methods	

TABLE 4

MEANS AND STANDARD DEVIATIONS FOR SCHOOL ORGANIZATION, SCHEDULING AND ENROLLMENT VARIABLES

Variable Number		Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
1	Mean	509.96	556.13	443.15	590.21	564.28	494.78	437.94	544.96	529.65
	S.D.	220.66	273.34	204.79	315.03	301.37	242.86	224.60	255.82	264.58
	N	519	297	145	462	206	110	281	613	2632
2	Mean	1.48	1.41	1.50	1.45	1.48	1.47	1.54	1.45	1.47
	S.D.	.50	.49	.50	.50	.50	.50	.50	.50	.50
	N	540	310	145	459	203	108	274	601	2640
10	Mean	1.17	1.16	1.18	1.18	1.20	1.18	1.17	1.24	1.17
	S.D.	.37	.37	.38	.38	.40	.39	.38	.43	.39
	N	524	306	140	449	205	105	270	569	2569
21	Mean	.04	.04	.04	.04	.04	.04	.04	.04	.04
	S.D.	.01	.03	.01	.01	.01	.02	.03	.01	.02
	N	506	284	141	449	201	110	273	601	2568
31	Mean	.13	.15	.10	.09	.18	.20	.09	.15	.13
	S.D.	.33	.35	.31	.28	.38	.40	.29	.36	.34
	N	537	308	143	455	205	109	273	598	2628
33	Mean	.08	.04	.13	.09	.08	.07	.04	.10	.08
	S.D.	.26	.21	.34	.28	.28	.26	.19	.31	.27
	N	543	313	145	462	206	110	282	614	2675
34	Mean	.66	.77	.71	.80	.74	.81	.76	.57	.70
	S.D.	.47	.42	.46	.40	.44	.39	.43	.50	.46
	N	543	313	145	462	206	110	282	614	2675
35	Mean	.18	.11	.08	.06	.11	.11	.16	.24	.15
	S.D.	.38	.31	.27	.23	.31	.31	.37	.43	.35
	N	543	313	145	462	206	110	282	614	2675

TABLE 5

MEANS AND STANDARD DEVIATIONS FOR RESOURCE VARIABLES

Variable Number		Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
3	Mean	1.46	1.51	1.66	1.72	1.49	1.52	1.51	1.40	1.52
	S.D.	.50	.50	.48	.45	.50	.50	.50	.49	.50
	N	533	300	143	451	200	108	271	590	2596
4	Mean	1.53	1.68	1.73	1.75	1.55	1.66	1.55	1.45	1.59
	S.D.	.50	.47	.44	.44	.50	.48	.50	.50	.49
	N	524	296	142	451	195	108	264	575	2555
5	Mean	1.80	1.84	1.60	1.72	1.78	1.82	1.85	1.83	1.79
	S.D.	.40	.37	.49	.45	.41	.38	.36	.38	.41
	N	522	301	141	449	202	107	272	585	2579
6	Mean	2.53	2.53	2.57	2.66	2.53	2.60	2.53	2.50	2.55
	S.D.	.57	.52	.55	.50	.55	.55	.54	.54	.54
	N	489	282	133	431	191	106	261	540	2433
7	Mean	2.60	2.54	2.62	2.69	2.55	2.61	2.57	2.48	2.58
	S.D.	.52	.51	.52	.48	.50	.49	.53	.52	.51
	N	501	282	134	432	178	109	267	541	2444
8	Mean	2.53	2.50	2.52	2.62	2.47	2.59	2.52	2.48	2.53
	S.D.	.56	.52	.56	.52	.67	.53	.54	.54	.54
	N	475	274	128	417	80	103	256	526	2359
9	Mean	2.57	2.52	2.58	2.62	2.48	2.58	2.53	2.46	2.54
	S.D.	.53	.51	.49	.49	.55	.50	.54	.52	.52
	N	491	277	130	420	174	106	261	524	2383
12	Mean	1.43	1.54	1.42	1.43	1.22	1.48	1.38	1.34	1.40
	S.D.	.50	.50	.50	.50	.41	.50	.49	.47	.49
	N	543	313	145	462	206	110	282	614	2675
14	Mean	1.51	1.58	1.54	1.70	1.53	1.67	1.46	1.71	1.60
	S.D.	.50	.49	.50	.46	.50	.48	.50	.45	.49
	N	537	308	144	461	204	108	278	589	2629
22	Mean	.72	.55	.55	.58	.56	.80	.68	.76	.66
	S.D.	.45	.50	.50	.49	.50	.41	.47	.43	.47
	N	543	313	145	462	206	110	282	614	2675
28	Mean	.45	.28	.37	.36	.41	.36	.38	.36	.37
	S.D.	.50	.45	.49	.48	.49	.48	.49	.48	.48
	N	540	310	145	456	206	109	278	607	2651
30	Mean	.55	.54	.59	.61	.57	.62	.58	.54	.57
	S.D.	.50	.50	.49	.49	.50	.49	.49	.50	.50
	N	539	308	143	454	204	110	280	604	2642
43	Mean	2.46	2.50	2.50	2.63	7.42	2.57	2.53	2.37	2.49
	S.D.	.59	.57	.63	.55	.60	.57	.61	.63	.60
	N	537	310	143	458	203	110	276	602	2639
44	Mean	2.47	2.45	2.45	2.62	2.38	2.58	2.52	2.39	2.48
	S.D.	.60	.56	.63	.54	.63	.55	.59	.61	.59
	N	534	310	142	455	200	110	275	597	2623

TABLE 6

MEANS AND STANDARD DEVIATIONS FOR SCIENCE COURSE IMPROVEMENT PROJECT VARIABLES

Variable Number		Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
23	Mean	.03	.06	.12	.06	.04	.15	.08	.02	.05
	S.D.	.17	.23	.32	.25	.20	.36	.27	.13	.22
	N	543	313	145	462	206	110	282	614	2675
24	Mean	.05	.05	.20	.11	.03	.20	.11	.03	.08
	S.D.	.23	.23	.40	.32	.17	.40	.31	.17	.27
	N	543	313	145	462	206	110	282	614	2675
25	Mean	.11	.10	.19	.15	.15	.07	.15	.15	.14
	S.D.	.31	.30	.39	.36	.35	.26	.35	.35	.34
	N	543	313	145	462	206	110	282	614	2675
26	Mean	.08	.06	.07	.05	.02	.13	.10	.07	.07
	S.D.	.27	.23	.25	.22	.14	.33	.30	.25	.25
	N	543	313	145	462	206	110	282	614	2675
27	Mean	.23	.20	.41	.31	.21	.45	.33	.23	.27
	S.D.	.42	.40	.49	.46	.41	.50	.47	.42	.44
	N	543	313	145	462	206	110	282	614	2675
81	Mean	.13	.18	.30	.18	.16	.24	.24	.13	.17
	S.D.	.33	.39	.46	.39	.36	.43	.43	.33	.38
	N	543	313	145	462	206	110	282	614	2675
82	Mean	.10	.13	.23	.15	.13	.21	.21	.11	.14
	S.D.	.29	.33	.43	.35	.34	.41	.41	.32	.35
	N	543	313	145	462	206	110	282	614	2675

TABLE 7

MEANS AND STANDARD DEVIATIONS FOR SCHOOL CURRICULUM AND MATERIALS VARIABLES

Variable Number		Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
11	Mean	1.82	1.93	1.90	1.84	1.77	1.86	1.86	1.77	1.83
	S.D.	.38	.26	.30	.37	.42	.35	.35	.42	.37
	N	524	301	138	450	192	101	265	564	2535
13	Mean	1.80	1.90	1.76	1.84	1.78	1.84	1.78	1.73	1.80
	S.D.	.40	.30	.43	.37	.41	.37	.42	.45	.40
	N	512	299	143	457	199	97	272	573	2552
29	Mean	.40	.57	.31	.41	.53	.31	.40	.40	.42
	S.D.	.49	.50	.46	.49	.50	.47	.49	.49	.49
	N	529	305	137	455	201	105	277	607	2616
32	Mean	.31	.46	.52	.44	.27	.37	.34	.54	.42
	S.D.	.46	.50	.50	.50	.44	.49	.47	.50	.49
	N	541	313	145	462	206	110	282	613	2672
61	Mean	.19	.21	.16	.17	.27	.14	.23	.17	.19
	S.D.	.39	.40	.37	.38	.45	.35	.42	.38	.39
	N	533	307	141	449	201	105	273	578	2587
62	Mean	.26	.38	.35	.39	.23	.27	.24	.28	.30
	S.D.	.44	.49	.48	.49	.42	.44	.43	.45	.46
	N	533	307	141	449	201	105	273	577	2586
63	Mean	.46	.25	.34	.24	.39	.30	.31	.36	.34
	S.D.	.50	.44	.48	.43	.49	.46	.46	.48	.47
	N	533	307	141	449	201	105	273	577	2586
64	Mean	.07	.07	.13	.08	.08	.11	.07	.08	.08
	S.D.	.25	.26	.33	.28	.27	.32	.25	.28	.27
	N	533	307	141	449	201	105	273	577	2586
65	Mean	.11	20	.16	.20	.13	.19	.16	.17	.16
	S.D.	.31	.40	.37	.40	.34	.39	.37	.38	.37
	N	533	307	141	449	201	105	273	577	2586
66	Mean	.22	.30	.26	.29	.23	.27	.21	.28	.26
	S.D.	.43	.47	.44	.46	.42	.44	.40	.45	.44
	N	533	307	141	449	201	105	273	577	2586

TABLE 8

MEANS AND STANDARD DEVIATIONS FOR TEACHER CHARACTERISTICS
A BACKGROUND VARIABLES

Variable Number		Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
36	Mean	1.33	1.46	1.42	1.38	1.29	1.51	1.29	1.19	1.34
	S.D.	.49	.50	.50	.48	.46	.50	.45	.40	.47
	N	542	312	143	461	201	110	280	610	2659
37	Mean	8.95	9.68	8.51	9.21	10.41	8.62	10.91	11.54	9.96
	S.D.	7.27	6.80	7.49	7.71	8.67	6.40	9.05	9.65	8.24
	N	537	313	144	460	203	109	280	611	2657
38	Mean	8.16	9.12	7.97	8.38	8.59	8.19	9.99	10.01	8.95
	S.D.	6.89	6.68	6.84	7.36	6.98	6.00	8.40	8.59	7.52
	N	529	308	144	454	200	108	280	587	2610
39	Mean	6.30	7.06	6.46	7.28	7.10	6.93	7.15	8.71	7.29
	S.D.	5.53	5.49	5.94	6.56	6.59	5.92	6.02	8.17	6.60
	N	535	309	141	456	201	107	279	598	2626
40	Mean	1.28	1.24	1.42	1.41	1.31	1.25	1.23	1.67	1.27
	S.D.	.45	.43	.50	.49	.46	.43	.42	.37	.45
	N	537	311	145	461	205	110	282	610	2661
41	Mean	1.32	1.21	1.31	1.28	1.21	1.23	1.29	1.24	1.26
	S.D.	.47	.41	.47	.45	.42	.43	.45	.43	.44
	N	529	310	144	450	200	107	272	578	2590
42	Mean	6.25	6.30	8.21	7.67	5.65	6.36	5.77	6.64	6.60
	S.D.	5.36	5.90	6.03	8.54	4.36	5.78	5.06	5.49	6.11
	N	517	296	131	430	194	107	266	566	2507
84	Mean	19.17	21.19	16.98	17.41	14.72	18.54	14.02	15.53	17.25
	S.D.	14.75	23.55	14.82	17.47	11.85	14.14	9.83	13.48	15.78
	N	517	296	131	430	194	107	266	566	2507
85	Mean	3.59	3.61	4.22	3.93	3.31	4.02	3.29	3.17	3.62
	S.D.	4.72	4.77	5.08	5.11	3.51	4.16	3.33	4.20	4.47
	N	517	296	131	430	194	107	266	566	2507

TABLE 9

MEANS AND STANDARD DEVIATIONS FOR TEACHER PRACTICES, PREFERENCES AND CONCERNS VARIABLES

Variable Number		Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
15	Mean	1.84	1.62	1.64	1.81	1.85	1.81	1.81	1.81	1.81
	S.D.	.37	.38	.48	.39	.36	.39	.39	.40	.39
	N	525	295	140	445	192	106	275	594	2572
16	Mean	1.83	1.73	1.81	1.81	1.76	1.80	1.81	1.70	1.78
	S.D.	.38	.44	.39	.39	.43	.40	.40	.46	.42
	N	526	295	140	446	192	106	275	594	2574
17	Mean	1.65	1.86	1.66	1.74	1.70	1.85	1.80	1.74	1.74
	S.D.	.48	.34	.47	.44	.46	.36	.40	.44	.44
	N	526	295	140	446	192	106	275	594	2574
18	Mean	1.73	1.84	1.70	1.81	1.79	1.85	1.86	1.78	1.79
	S.D.	.45	.37	.46	.39	.41	.36	.35	.41	.41
	N	526	295	140	446	192	106	275	594	2574
19	Mean	1.54	1.55	1.49	1.60	1.51	1.63	1.56	1.51	1.55
	S.D.	.50	.50	.50	.49	.50	.48	.50	.50	.50
	N	526	295	140	446	192	106	275	594	2574
20	Mean	1.48	1.73	1.66	1.63	1.47	1.56	1.55	1.74	1.62
	S.D.	.50	.45	.48	.48	.50	.50	.50	.44	.49
	N	526	295	140	446	192	106	275	593	2573
45	Mean	2.26	2.50	2.09	2.24	2.37	2.31	2.25	2.28	2.29
	S.D.	.67	.64	.73	.72	.66	.65	.71	.74	.70
	N	520	302	137	438	188	107	273	563	2528
46	Mean	2.02	2.03	2.09	2.11	2.23	2.17	2.14	2.13	2.10
	S.D.	.80	.82	.80	.79	.76	.78	.77	.77	.79
	N	507	293	134	435	179	104	266	554	2472
47	Mean	1.68	1.87	1.71	1.81	1.68	1.83	1.73	2.06	1.82
	S.D.	.77	.83	.80	.81	.79	.84	.82	.85	.82
	N	499	289	130	425	176	104	255	528	2406
48	Mean	1.96	1.95	1.92	1.90	2.04	1.93	2.04	2.02	1.97
	S.D.	.72	.71	.70	.71	.71	.72	.72	.70	.71
	N	538	312	145	460	202	109	279	602	2647
49	Mean	1.90	1.86	1.84	1.73	1.96	1.78	1.81	1.96	1.87
	S.D.	.69	.67	.73	.71	.71	.69	.67	.69	.70
	N	537	312	145	460	202	109	279	606	2650
50	Mean	1.99	2.05	1.95	1.84	1.93	1.95	1.92	2.03	1.96
	S.D.	.74	.73	.76	.73	.73	.80	.72	.74	.74
	N	531	310	144	459	202	108	275	598	2627
51	Mean	1.45	1.46	1.47	1.34	1.50	1.34	1.38	1.57	1.45
	S.D.	.64	.65	.70	.60	.69	.55	.59	.71	.65
	N	519	302	136	445	198	108	268	578	2554
52	Mean	1.69	1.74	1.67	1.67	1.65	1.73	1.63	1.59	1.66
	S.D.	.62	.67	.66	.64	.65	.62	.60	.59	.63
	N	526	305	144	454	200	108	276	595	2608
53	Mean	1.84	1.95	1.74	1.86	1.73	1.83	1.79	1.71	1.81
	S.D.	.64	.67	.69	.63	.62	.63	.62	.65	.65
	N	530	306	143	451	200	109	270	597	2606
54	Mean	1.79	1.82	1.68	1.77	1.65	1.77	1.74	1.69	1.75
	S.D.	.64	.66	.64	.64	.65	.62	.61	.64	.64
	N	527	305	142	450	199	108	271	592	2594
55	Mean	1.97	1.97	1.99	1.87	1.79	1.82	1.94	1.88	1.91
	S.D.	.76	.77	.80	.80	.76	.80	.75	.77	.77
	N	523	306	144	452	201	109	277	593	2605
56	Mean	1.66	1.70	1.47	1.71	1.54	1.64	1.59	1.53	1.61
	S.D.	.62	.66	.59	.65	.61	.69	.64	.63	.64
	N	528	309	145	448	197	107	272	589	2595

TABLE 9 Continued

Variable Number		Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
57	Mean	1.48	1.45	1.44	1.43	1.27	1.44	1.36	1.39	1.41
	S.D.	.67	.67	.66	.67	.53	.66	.57	.63	.64
	N	530	309	140	456	198	108	274	595	2610
58	Mean	1.57	1.59	1.51	1.54	1.47	1.45	1.44	1.51	1.52
	S.D.	.69	.69	.68	[illegible]	.68	.60	.60	.68	.67
	N	525	306	143	451	201	109	271	592	2598
59	Mean	1.66	1.84	1.56	1.69	1.66	1.68	1.59	1.62	1.67
	S.D.	.73	.79	.74	.72	.74	.73	.67	.72	.73
	N	529	310	144	454	202	109	276	601	2625
60	Mean	1.98	1.90	1.92	1.77	1.83	1.94	1.92	1.82	1.87
	S.D.	.73	.72	.75	.76	.74	.70	.77	.72	.74
	N	516	299	143	444	197	107	270	572	2548
67	Mean	.95	.59	.55	.55	.67	.52	.42	.63	.61
	S.D.	1.19	.94	.97	.94	1.13	.86	.78	1.10	1.02
	N	243	222	143	451	200	104	272	585	2220
68	Mean	1.41	.98	.89	.91	.65	1.08	.86	.59	.88
	S.D.	1.49	1.23	1.31	1.28	1.07	1.38	1.19	1.00	1.24
	N	[illegible]	243	143	451	200	104	272	585	2291
69	Mean	3.09	2.64	2.43	2.48	2.73	2.42	2.64	2.79	2.72
	S.D.	1.37	1.54	1.59	1.54	1.55	1.59	1.39	1.53	1.53
	N	456	284	143	451	200	104	272	590	2500
70	Mean	1.82	1.57	1.61	1.49	1.30	1.34	1.52	.97	1.41
	S.D.	1.41	1.47	1.59	1.49	1.39	1.52	1.52	1.30	1.46
	N	363	268	143	451	200	104	272	591	2392
71	Mean	1.37	1.13	1.11	.97	1.08	.74	.98	1.18	1.10
	S.D.	1.36	1.24	1.34	1.24	1.36	1.13	1.27	1.35	1.31
	N	327	236	143	451	200	104	272	589	2322
72	Mean	1.08	1.07	.71	.63	1.10	.84	.86	.93	.90
	S.D.	1.18	1.18	.92	.83	1.18	1.13	1.01	1.06	1.06
	N	340	248	143	451	200	104	272	589	2347
73	Mean	2.20	1.89	1.81	2.22	2.11	1.89	1.94	2.01	2.05
	S.D.	1.28	1.27	1.37	1.33	1.29	1.31	1.20	1.31	1.30
	N	422	282	143	451	200	104	272	590	2464
74	Mean	.74	.74	.69	.63	.54	.74	.58	.63	.65
	S.D.	.94	.91	.96	.89	.84	.86	.75	.86	.88
	N	285	245	143	451	200	104	272	590	2290
75	Mean	1.54	1.54	1.10	1.32	1.49	1.25	1.37	1.59	1.45
	S.D.	1.22	1.18	1.08	1.11	1.17	1.16	1.15	1.19	1.17
	N	411	284	143	451	200	104	272	590	2455
76	Mean	.63	.37	.25	.20	.26	.32	.11	.25	.27
	S.D.	1.10	.93	.82	.68	.75	.86	.45	.74	.77
	N	172	204	143	451	200	104	272	590	2136
77	Mean	1.23	1.36	1.03	1.00	1.02	1.29	1.04	1.14	1.13
	S.D.	1.27	1.31	1.24	1.18	1.06	1.34	1.25	1.20	1.22
	N	336	258	143	451	200	104	272	566	2350
78	Mean	.33	.16	.11	.09	.17	.12	.06	.13	.13
	S.D.	.81	.58	.46	.42	.59	.43	.34	.50	.51
	N	135	198	143	451	200	104	272	586	2089
79	Mean	.83	.70	.41	.37	.43	.43	.33	.74	.55
	S.D.	1.25	1.22	.82	.77	.95	.92	.78	1.17	1.03
	N	181	219	143	450	200	104	271	585	2153
80	Mean	3.59	3.45	3.71	3.74	3.65	3.64	3.65	3.69	3.64
	S.D.	1.18	1.15	1.15	1.05	1.02	1.15	1.00	1.04	1.09
	N	536	303	143	453	203	107	279	598	2622
83	Mean	1.44	1.42	1.47	1.51	1.43	1.46	1.46	1.45	1.46
	S.D.	.50	.50	.50	.50	.50	.50	.50	.50	.50
	N	525	299	126	403	178	108	261	574	2474

Twenty variables of specific interest were designated as dependent or criterion variables in the regression analyses in order to determine which of the independent or combination of independent variables best predicted the dependent variables. The dependent variables were grouped into one of four categories according to similarity as shown in Table 10 and will be discussed in the respective category sections in this report.

TABLE 10

DEPENDENT VARIABLES GROUPED ACCORDING TO SIMILARITIES

I. Variables Related to the Elementary School Implementation of National Science Foundation Science Curriculum Improvement Projects

- School Use of Any Science Curriculum Improvement Project Materials
- School Use of Science Curriculum Improvement Study Materials
- School Use of Elementary Science Study Materials
- School Use of Science - A Process Approach Materials
- School Use of Other Science Curriculum Improvement Project Materials
- Teacher Currently or Previously Had Taught Science Curriculum Improvement Project Materials
- Teacher Attendance at Science Curriculum Improvement Project Workshops or Institutes

II. Variables Related to Other School Programs, Materials and Practices

- School Offering of Narcotics or Drug Abuse Education
- School Offering of Health Education
- School Offering of Environmental and/or Conservation Science
- Availability of Special Facilities for the Teaching of Environmental and/or Conservation Science
- Use of Special Procedures to Identify Students with an Interest in Science
- Teacher Use of Locally Prepared Curriculum Materials for Teaching Science

III. Variables Related to Teacher Ranking of the Relative Use of Various Learning Activities

- Small Group Discussion
- Independent Studies
- Individual Laboratory
- Group Laboratory
- Excursions or Field Studies

IV. Variables Related to Teacher Responsibility for and Satisfaction with Teaching Elementary School Science

- Teacher Role or Responsibility for Teaching Science
- Teacher Satisfaction with Teaching Elementary School Science

Data Analysis

Determination of response frequencies and means and standard deviations of all variables was carried out. These results are reported elsewhere (Howe, et al., 1974) although the means and standard deviations of the 85 variables included in the regression analysis are shown in Tables 4-9. A listing of the 143 variables included in the correlation analysis is given in Appendix C.

The correlation analysis was performed using the BMD03D computer program, Correlation with Item Deletion (Dixon, 1970). The large number of variables (143) being correlated necessitated the selection of a stringent alpha level since the significance level was effectively reduced due to the multiple correlations. In order for a particular correlation between variables to be considered significant, an alpha level of 0.001 or less in four or more of the eight regions was demanded. All correlations reported in this document met this criteria. The correlation matrix table is not included in this report and significant correlations are only reported qualitatively.

The regression analysis was carried out using the BMD02R computer program, Stepwise Regression (Dixon, 1970). The purpose of the regression analysis was to determine which variable or combination of variables was predictive of certain specified dependent or criterion variables. Eighty-five of the 143 variables used in the correlation analysis were included in the regression analysis. In order for a variable to be considered a significant predictor, at least five percent of the variance of the regression equation had to be accounted for by the variable. This occasionally resulted in highly correlated, but different individual predictors of the independent variable.

Variables which were highly similar to the dependent variable were restricted from entering the stepwise regression analysis. For example, specific variables from which a more general variable was generated were not allowed to enter the regression analysis when the general variable was used as a criterion variable. If several variables were measures of the same thing, and if one was used as a criterion, the other(s) was not entered into the regression analysis.

Variables which made logical and educational sense are discussed in this report as predictor variables of the criterion variable. Other significant variables are reported only as accounting for a significant amount of the regression equation variance.

Section II

Elementary School Implementation of National Science Foundation Science Curriculum Improvement Projects

Information on the implementation of elementary Science Curriculum Improvement Project (SCIP) materials into the elementary schools was obtained from both the elementary principal and teacher questionnaires. The principals indicated by grade level any SCIP being taught in their schools, whereas the teachers indicated each SCIP which they were currently or had previously taught. Five new school variables were generated from the principal's individual grade level responses. Three of these variables indicated whether specific SCIPs (SCIS, ESS, SAPA) were taught in the school. A fourth generated variable indicated whether any other SCIP materials were being taught and the remaining variable was generated from the previous four variables to indicate whether any SCIP was being taught in the school.

Two variables were generated from the teacher's individual responses relating to SCIP materials. One variable indicated whether the teacher was currently or had previously taught any SCIP.. The other variable was to determine whether the teacher had ever attended a SCIP workshop or institute. The principal's responses were interpreted as school responses whereas the teacher responses were interpreted as individual responses.

<u>School Use of Any Science Curriculum Improvement Project Materials</u>

If the principal indicated that one or more of any of the existing NSF Science Curriculum Improvement Projects was being taught at any grade level in his school this variable was given a value of 1; otherwise, it was assigned a value of 0. This variable was the most general of all the variables used as measures of the use of elementary SCIPs and would give the highest possible estimate for the school use of SCIPs since the use at any grade level of any SCIP would result in an indication of use for this variable.

The regional and total mean values for the use of any Science Curriculum Improvement Project are given in Table 11. The means ranged from a low of 0.20 for the Farwest region to a high of 0.45 for the Rocky Mountains region and was 0.27 for the total sample. This can be interpreted as meaning that between 20 and 45 percent, depending on the region, of the elementary schools responding were using at least one SCIP. The usage was also low in the Great Lakes, Southwest, and Southeast regions which all indicated that less than 25 percent of the responding schools utilized any of the Science Curriculum Improvement Projects.

There was considerable difference in the utilization of the elementary SCIPs as compared to secondary SCIPs for the schools sampled in the

TABLE 11

MEANS[a] AND STANDARD DEVIATIONS FOR THE SCHOOL USE OF ANY SCIENCE CURRICULUM IMPROVEMENT PROJECT (SCIP) MATERIALS

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	.23	.20	.41	.31	.21	.45	.33	.23	.27
S.D.	.42	.40	.49	.46	.41	.50	.47	.42	.44
N	543	313	145	462	206	110	282	614	2675

[a]yes = 1, no = 0

secondary study. The percentage of secondary schools sampled using at least one secondary SCIP ranged from 38 to 81 for the eight regions and was 62 overall (White, et al., 1974). The most apparent difference was in the Farwest region where 81 percent of the sample secondary schools used at least one secondary SCIP while the percentage of sample elementary schools using at least one SCIP was only 20. As in the secondary study, the use of elementary SCIPs for the Southwest and Southeast regions was lower than most other regional areas.

The use of Science Curriculum Improvement Projects resulted in significant ($\alpha \leq 0.001$) positive correlations in at least four of the eight regions with the following variables:

+School use of SCIS, ESS, SAPA, and any other SCIP
+Teacher currently teaching or previously had taught a SCIP
+Teacher attendance at a SCIP workshop or institute
+Use of special teacher, specialists or outside help for the teaching of science in grades K, 1, 2, 3, 4, and 6
+Provision of consultant or supervisory help to teacher for teaching science
+Teacher use of group laboratory activities as a frequent learning activity

The use of Science Curriculum Improvement Projects resulted in significant ($\alpha \leq 0.001$) negative correlations in at least four of the eight regions with the following variable:

-Teacher use of lecture-discussion as a frequent learning activity

The correlations shown above suggest that the dependent variables related to the implementation of Science Curriculum Improvement Project (SCIP) materials were highly correlated. If these variables were allowed to enter the stepwise regression analysis, other variables highly correlated with them would most liekly not show up as significant predictors of the school use of SCIP materials. In order to investigate other variables which would be predictive of the use of SCIP materials, two stepwise regression analyses were performed:

1) Analysis 1: All dependent variables (23, 24, 25, 26) related to the school use of specific SCIP materials were restricted from entering the regression analysis.

2) Analysis 2: All dependent variables (23, 24, 25, 26, 81, 82) (except the one under study) related to the implementation of SCIP materials were restricted from entering the regression analysis.

The results of these analyses are given in Table 12 for each region. The teacher variable related to the previous or present teaching of any SCIP was a significant predictor of the school use of any SCIP materials in all regions. This indicated that in schools where SCIP materials were being used, the sample teacher likely was or had engaged in the teaching of a SCIP. This could be a common phenomena, but could also be an indication of the principal selecting certain teachers to complete the questionnaire rather than using the random procedures as requested.

The relative use of group laboratory activities occurred as a significant contributor to the multiple regression equation for the prediction of the use of any Science Curriculum Improvement Project materials in the elementary schools in the Southwest, Rocky Mountains and Plains regions. In these regions teachers who made frequent use of group laboratory activities were most likely to be in schools in which SCIP materials were being used. No other variable was a significant contributor to the regression equation in more than two regions.

Those variables which contributed significantly to the prediction of the use of any SCIP in two regions were:

1) Provision of consultant help in teaching science in the New England and Plains regions. Schools or systems which provided consultant or supervisory help in the teaching of science were also more likely to be using SCIP materials.

2) A cluster of variables dealing with the adequacy of supplies and equipment and money or provision to purchase materials. These were four different, but closely related variables which respectively made significant contributions to the prediction equation in the Great Lakes, New England, Mideast and Southeast regions. Those schools where adequate supplies and equipment were available and where funds or a budget for supplies were available were more likely to have implemented SCIP materials.

The only predictor of the School Use of Any Science Curriculum Improvement Project materials for all eight regions was the previous or present teaching of a SCIP by the teacher. The use of group laboratory activities and the adequacy of supplies, equipment and monies represented a group of variables generally predictive of improvement project usage.

School Use of Science Curriculum Improvement Study (SCIS) Materials

The school use of Science Curriculum Improvement Study (SCIS) materials was determined from the Principal's Questionnaire. If the use of SCIS materials was indicated for any grade level in the school the generated variable was assigned a value of 1, otherwise it was assigned a value of 0.

TABLE 12

SUMMARY OF STEPWISE REGRESSION ANALYSES FOR PREDICTION OF SCHOOL USE OF ANY SCIENCE CURRICULUM IMPROVEMENT PROJECT (SCIP) MATERIALS

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 543	Restrict Var 23-26	81 Tch SCIP	0.43	0.18	0.18	0.43
	Restrict Var 23-26,81,82	06 Avail Suppl, 1-3	0.23	0.05	0.05	0.23
Farwest N = 313	Restrict Var 23-26	81 Tch SCIP	0.42	0.18	0.18	0.42
	Restrict Var 23-26,81,82	None	----	----	----	----
New England N = 145	Restrict Var 23-26	81 Tch SCIP	0.47	0.22	0.22	0.47
		50 Lack Funds	0.52	0.27	0.05	-0.32
	Restrict Var 23-26,81,82	14 Consult/Sup Help Tch	0.33	0.11	0.11	0.33
		50 Lack Funds	0.41	0.17	0.06	-0.32
		61 Single Text-Lab Manl	0.46	0.21	0.05	-0.22
Mideast N = 462	Restrict Var 23-26	81 Tch SCIP	0.48	0.23	0.23	0.48
	Restrict Var 23-26,81,82	08 Avail Equip, 1-3	0.23	0.05	0.05	0.23
Southwest N = 206	Restrict Var 23-26	81 Tch SCIP	0.51	0.26	0.26	0.51
		70 Group Lab	0.56	0.31	0.06	0.41
	Restrict Var 23-26,81,82	70 Group Lab	0.41	0.17	0.17	0.41
Rocky Mountains N = 110	Restrict Var 23-26	81 Tch SCIP	0.39	0.16	0.16	0.39
		70 Group Lab	0.48	0.23	0.07	0.34
		03 Budget Sci Equip	0.54	0.29	0.06	0.21
		11 Environ/Cons Sci	0.60	0.36	0.07	-0.25
	Restrict Var 23-26,81,82	70 Group Lab	0.34	0.12	0.12	0.34
		30 Outside Help Tch Sci	0.43	0.19	0.07	0.30
		19 Att Demon Tching	0.49	0.24	0.05	0.25
Plains N = 282	Restrict Var 23-26	81 Tch SCIP	0.46	0.21	0.21	0.46
		14 Consult/Sup Help Tch	0.52	0.27	0.06	0.33
	Restrict Var 23-26,81,82	70 Group Lab	0.33	0.11	0.11	0.33
		14 Consult/Sup Help Tch	0.42	0.18	0.07	0.33
		68 Indiv Lab	0.47	0.22	0.04	0.29
		77 Indep Study	0.52	0.27	0.05	-0.20
Southeast N = 614	Restrict Var 23-26	81 Tch SCIP	0.37	0.14	0.14	0.37
	Restrict Var 23-26,81,82	04 Budget Sci Supplies	0.23	0.05	0.05	0.23
Total U.S. N = 2676	Restrict Var 23-26	81 Tch SCIP	0.44	0.20	0.20	0.44
	Restrict Var 23-26,81,82	70 Group Lab	0.21	0.05	0.05	0.21

The mean values for the use of SCIS in the elementary schools are given in Table 13. They range from a low of 0.02 in the Southeast region to a high of 0.15 in the Rocky Mountains region. The overall mean for all the schools was 0.05. These means can be interpreted to imply that between 2 and 15 percent of the schools responding were using SCIS materials in at least one grade level depending on the region. The New England region was the only other region with more than a 10 percent school usage of SCIS materials.

TABLE 13

MEANS[a] AND STANDARD DEVIATIONS FOR THE SCHOOL USE OF SCIENCE CURRICULUM IMPROVEMENT STUDY (SCIS) MATERIALS

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	.03	.06	.12	.06	.04	.15	.08	.02	.05
S.D.	.17	.23	.32	.25	.20	.36	.27	.13	.22
N	543	313	145	462	206	110	282	614	2675

[a]yes = 1, no = 0

The use of SCIS materials resulted in significant ($\alpha \leq 0.001$) positive correlations in at least four of the regions with the following variables:

+School use of any SCIP materials
+Teacher currently or previously had taught a SCIP
+Teacher attendance at a SCIP workshop or institute

There were no variables which resulted in significant ($\alpha \leq 0.001$) negative correlations with the school use of SCIS materials.

The results of the two stepwise regression analyses are shown in Table 14. The analyses indicate that the best predictor of the school use of SCIS materials was whether the teacher had attended a SCIP workshop or institute. This was true for the Farwest, Mideast, and Rocky Mountains regions in addition to the total sample. The school use of Elementary School Science (ESS) materials was also a significant predictor in the Mideast and Southeast regions. When the variables related to the implementation of SCIP materials were restricted from entering the regression analysis, there were no consistent variables predictive of the school use of SCIS materials.

School Use of Elementary Science Study (ESS) Materials

The school use of Elementary Science Study (ESS) materials, was determined from the Principal's Questionnaire. The variable was assigned a value of 1 for use at any grade level, otherwise it was assigned a value of 0. The mean values are reported in Table 15. The values for the school use of ESS materials ranged from a low of 0.03 in the Southeast region to a high of 0.20 in the New England and Rocky Mountains regions. The total mean for all schools was 0.08. These means indicated that between 3 and 20 percent of the sample schools, depending on the region, and totally about 8 percent of the sample schools were using ESS materials at some grade level. As with SCIS materials, the usage was lowest in the Southeast region and highest in the New England and Rocky Mountains regions, but overall and for all regions

TABLE 14

SUMMARY OF STEPWISE REGRESSION ANALYSES FOR PREDICTION OF SCHOOL USE OF SCIENCE CURRICULUM IMPROVEMENT STUDY (SCIS) MATERIALS

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 543	Restrict Var 27	None	----	----	----	----
	Restrict Var 24,25,26,27,81,82	None	----	----	----	----
Farwest N = 313	Restrict Var 27	82 Att SCIP Wrkshp/Inst	0.28	0.08	0.08	0.28
	Restrict Var 24,25,26,27,81,82	None	----	----	----	----
New England N = 145	Restrict Var 27	None	----	----	----	----
	Restrict Var 24,25,26,27,81,82	None	----	----	----	----
Mideast N = 462	Restrict Var 27	24 ESS	0.29	0.08	0.08	0.29
		82 Att SCIP Wrkshp/Inst	0.36	0.13	0.05	0.29
	Restrict Var 24,25,26,27,81,82	None	----	----	----	----
Southwest N = 206	Restrict Var 27	41 Master's Program	0.24	0.06	0.06	0.24
	Restrict Var 24,25,26,27,81,82	41 Master's Program	0.24	0.06	0.06	0.24
Rocky Mountains N = 110	Restrict Var 27	82 Att SCIP Wrkshp/Inst	0.27	0.08	0.08	0.27
		03 Budget Sci Equipment	0.34	0.12	0.04	0.16
		02 Departmentalization	0.41	0.17	0.05	0.25
	Restrict Var 24,25,26,27,81,82	02 Departmentalization	0.25	0.06	0.06	0.25
Plains N = 282	Restrict Var 27	81 Tch SCIP	0.28	0.08	0.08	0.28
	Restrict Var 24,25,26,27,81,82	14 Consult/Sup Help Tch	0.26	0.07	0.07	0.26
Southeast N = 614	Restrict Var 27	24 ESS	0.34	0.12	0.12	0.34
	Restrict Var 24,25,26,27,81,82	None	----	----	----	----
Total U.S. N = 2676	Restrict Var 27	82 Att SCIP Wrkshp/Inst	0.22	0.05	0.05	0.22
	Restrict Var 24,25,26,27,81,82	None	----	----	----	----

except the Farwest and Southwest the school usage of ESS materials was about 35 percent greater than the usage of SCIS materials.

TABLE 15

MEANS[a] AND STANDARD DEVIATIONS FOR THE SCHOOL USE OF ELEMENTARY SCIENCE STUDY (ESS) MATERIALS

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	.05	.05	.20	.11	.03	.20	.11	.03	.08
S.D.	.23	.23	.40	.32	.17	.40	.31	.17	.27
N	543	313	145	462	206	110	282	614	2675

[a]yes = 1, no = 0

The school use of ESS materials resulted in significant ($\alpha \leq 0.001$) positive correlations in at least four regions with the following variables:

+School use of any SCIP materials
+Teacher currently or previously had taught a SCIP
+Teacher attendance at a SCIP workshop or institute
+Use of special teacher, specialists or outside help for the teaching of science in grades 1, 2, and 3

There were no variables which resulted in significant negative correlations ($\alpha \leq 0.001$) with the school use of ESS materials.

The results of the two stepwise regression analyses are shown in Table 16. The best predictors of the school use of ESS materials were other variables related to the implementation of SCIP materials. Whether the teacher currently or previously had taught a SCIP was the best predictor in the New England, Mideast, and Plains regions in addition to the total sample. Teacher attendance at a SCIP workshop or institute was a significant predictor in the Farwest and Rocky Mountains regions. These results suggest that schools using ESS materials were likely to have teachers who had had some training in the use of SCIP materials.

School use of other elementary SCIP materials was a significant predictor in three regions, SAPA in the Farwest and SCIS in the Mideast and Southeast regions. This would indicate that schools using ESS materials tended to use SAPA and SCIS materials also.

The regression analysis in which the variables closely related to the implementation of SCIP materials were restricted from entering the analysis indicated that the teacher use of individual laboratory activities was the best predictor of the school use of ESS materials in the New England, Mideast and Rocky Mountains regions and for the total sample.

School Use of Science - A Process Approach (SAPA) Materials

The mean values for the elementary school use of Science - A Process Approach (SAPA) materials are given in Table 17. The means range from a

TABLE 16

SUMMARY OF STEPWISE REGRESSION ANALYSES FOR PREDICTION OF SCHOOL USE OF ELEMENTARY SCIENCE STUDY (ESS) MATERIALS

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 543	Restrict Var 27	69 Lecture.Disc	0.22	0.05	0.05	-0.22
	Restrict Var 23,25,26,27,81,82	69 Lecture.Disc	0.22	0.05	0.05	-0.22
Farwest N = 313	Restrict Var 27	25 SAPA	0.29	0.08	0.08	0.29
		82 Att SCIP Wrkshp/Inst	0.37	0.13	0.05	0.29
	Restrict Var 23,25,26,27,81,82	None	----	----	----	----
New England N = 145	Restrict Var 27	81 Tch SCIP	0.43	0.19	0.19	0.43
	Restrict Var 23,25,26,27,81,82	68 Indiv Lab	0.27	0.07	0.07	0.27
		36 Sex of Teacher	0.35	0.12	0.05	0.26
Mideast N = 462	Restrict Var 27	81 Tch SCIP	0.36	0.13	0.13	0.36
	Restrict Var 23,25,26,27,81,82	68 Indiv Lab	0.21	0.05	0.05	0.21
Southwest N = 206	Restrict Var 27	None	----	----	----	----
	Restrict Var 23,25,26,27,81,82	None	----	----	----	----
Rocky Mountains N = 206	Restrict Var 27	68 Indiv Lab	0.54	0.29	0.29	0.54
		82 Att SCIP Wrkshp/Inst	0.61	0.37	0.08	0.36
		60 Lack Inserv Opp	0.65	0.43	0.05	-0.36
	Restrict Var 23,25,26,27,81,82	68 Indiv Lab	0.54	0.29	0.29	0.54
		60 Lack Inserv Opp	0.61	0.37	0.08	-0.36
Plains N = 282	Restrict Var 27	81 Tch SCIP	0.30	0.09	0.09	0.30
	Restrict Var 23,25,26,27,81,82	None	----	----	----	----
Southeast N = 614	Restrict Var 27	23 SCIS	0.34	0.12	0.12	0.34
	Restrict Var 23,25,26,27,81,82	None	----	----	----	----
Total U.S. N = 2576	Restrict Var 27	81 Tch SCIP	0.30	0.09	0.09	0.30
	Restrict Var 23,25,26,27,81,82	None	----	----	----	----

low of 0.07 in the Rocky Mountains region to a high of 0.19 in the New England region. The overall mean was 0.14. This indicates that between 7 and 19 percent of the schools, depending on the region, were using SAPA materials and that overall 14 percent of the sample schools were using SAPA materials at some grade level. This is almost three times greater school use of SAPA materials than SCIS materials and almost double the school usage of ESS materials. The only region where the trend for greater school usage of SAPA materials was not present was in the Rocky Mountains region where the school usage of SAPA materials was about half of that of SCIS materials and about one third as much as ESS materials.

TABLE 17

MEANS[a] AND STANDARD DEVIATIONS FOR THE SCHOOL USE OF SCIENCE - A PROCESS APPROACH (SAPA) MATERIALS

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	.11	.10	.19	.15	.15	.07	.15	.15	.14
S.D.	.31	.30	.39	.36	.35	.26	.35	.36	.34
N	543	313	145	462	206	110	282	614	2675

[a]yes = 1, no = 0

The school use of SAPA materials resulted in significant ($\alpha \leq 0.001$) positive correlations in at least four regions with the following variables:

+School use of any SCIP materials
+Teacher currently or previously had taught a SCIP
+Teacher attendance at a SCIP workshop or institute
+Consultant or supervisory help provided to the classroom teacher
+Use of special teacher, specialists or outside help for the teaching of science in grades K, 1, 2, 3, and 4

There were no variables which resulted in significant ($\alpha \leq 0.001$) negative correlations with the school use of SAPA materials.

The results of the two stepwise regression analyses are shown in Table 18. As with ESS and SCIS, the best predictors of the school use of SAPA materials were teacher variables related to the implementation of SCIP materials. Whether the teacher was currently teaching or previously had taught a SCIP was the best predictor in the Farwest, Mideast, Southwest, and Southeast regions. Teacher attendance at a SCIP workshop or institute was a significant predictor in the Great Lakes and Plains regions.

The regression analysis in which the variables closely related to the implementation of SCIP materials were restricted from entering the analysis indicated that the teacher use of group laboratory activities was the best predictor of school use of SAPA materials in the Southwest, Plains, and Southeast regions.

Of particular interest was the result of the analysis for the Rocky Mountains region where teacher satisfaction was a significant predictor of

TABLE 18

SUMMARY OF STEPWISE REGRESSION ANALYSES FOR PREDICTION OF SCHOOL USE OF SCIENCE - A PROCESS APPROACH (SAPA) MATERIALS

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 543	Restrict Var 27	82 Att SCIP Wrkshp/Inst	0.32	0.11	0.11	0.32
	Restrict Var 23,24,26,27,81,82	None	----	----	----	----
Farwest N = 313	Restrict Var 27	81 Tch SCIP	0.33	0.11	0.11	0.33
	Restrict Var 23,24,26,27,81,82	None	----	----	----	----
New England N = 145	Restrict Var 27	14 Consult/Sup Help Tch	0.33	0.11	0.11	0.33
		47 Phonograph	0.43	0.18	0.07	0.28
	Restrict Var 23,24,26,27,81,82	14 Consult/Sup Help Tch	0.33	0.11	0.11	0.33
		47 Phonograph	0.43	0.18	0.07	0.28
Mideast N = 462	Restrict Var 27	81 Tch SCIP	0.27	0.07	0.07	0.27
	Restrict Var 23,24,26,27,81,82	None	----	----	----	----
Southwest N = 206	Restrict Var 27	81 Tch SCIP	0.54	0.30	0.30	0.54
	Restrict Var 23,24,26,27,81,82	70 Group Lab	0.37	0.13	0.13	0.37
Rocky Mountains N = 110	Restrict Var 27	80 Satisfaction Tch Sci	0.25	0.06	0.06	-0.25
	Restrict Var 23,24,26,27,81,82	80 Satisfaction Tch Sci	0.25	0.06	0.06	-0.25
Plains N = 282	Restrict Var 27	82 Att SCIP Wrkshp/Inst	0.33	0.11	0.11	0.33
		70 Group Lab	0.40	0.16	0.05	0.33
	Restrict Var 23,24,26,27,81,82	70 Group Lab	0.33	0.11	0.11	0.33
Southeast N = 614	Restrict Var 27	81 Tch SCIP	0.37	0.14	0.14	0.37
	Restrict Var 23,24,26,27,81,82	70 Group Lab	0.23	0.06	0.06	0.23
Total U.S. N = 2676	Restrict Var 27	81 Tch SCIP	0.31	0.10	0.10	0.31
	Restrict Var 23,24,26,27,81,82	None	----	----	----	----

the use of SAPA materials, except the relationship was a negative one in which the greater the teacher satisfaction, the lower the school usage of SAPA materials. This is particularly interesting because the Rocky Mountains region school usage of SAPA materials was much lower than their usage of other elementary SCIP materials, whereas the trend was the opposite in the other seven regions.

School Use of Other Science Curriculum Improvement Project (SCIP) Materials

This variable was generated from the Principal's Questionnaire in response to the use of a number of other specific SCIP materials in the school. The following SCIP materials included on the questionnaire, although not exhaustive, represented the more publicized SCIP materials:

Conceptually Oriented Program for Elementary Science (COPES)
Child Structured Learning in Science (CSLS)
Introductory Physical Science (IPS)
Intermediate Science Curriculum Study (ISCS)
Earth Science Curriculum Project (ESCP)
Elementary School Science Project (ESSP)
Minnesota Mathematics and Science Teaching Project (MINNEMAST)
Inquiry Development Project (IDP)
Time-Space-Matter (TSM)
Other

Some of these materials are for all elementary grade levels whereas others cover the intermediate, middle school or junior high school grade levels. The middle and junior high school materials were included because many elementary schools are organized to include grades 7 and 8. These materials were also included in the secondary study of Schlessinger, et al., (1971), White, et al., (1974).

If the principal indicated that any of the above or any other SCIP materials were being used at any elementary school grade level, the variable was assigned a value of 1, otherwise it was assigned a value of 0. The mean values are given in Table 19. They ranged from a low of 0.02 in the Southwest region to a high of 0.13 in the Rocky Mountains region. The overall mean for the total sample was 0.07. This suggests that between 2 and 13 percent of the sample schools were using a SCIP other than SCIS, ESS and SAPA depending on the region, and overall about 7 percent of the schools were using another SCIP. No attempt was made to individually determine the percentage of schools using each of the other SCIP materials.

TABLE 19

MEANS[a] AND STANDARD DEVIATIONS FOR THE SCHOOL USE OF OTHER SCIENCE CURRICULUM IMPROVEMENT PROJECT (SCIP) MATERIALS

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	08	.06	07	.05	.02	.13	.10	.07	.07
S.D.	.27	.23	.25	.22	.14	.33	.30	.25	.25
N	543	313	145	462	206	110	282	614	2675

[a]yes = 1, no = 0

The use of other SCIP materials resulted in a significant ($\alpha \leq 0.001$) positive correlation with the following variable:

+School use of any SCIP materials

There were no variables which resulted in significant ($\alpha \leq 0.001$) negative correlations with the school use of other SCIP materials.

The results of the two stepwise regression analyses are shown in Table 20. The only variable which was predictive of the use of other SCIP materials in more than one region was the teacher lack of knowledge of science methods as a major hinderance to the effective teaching of science. This was a significant predictor in the Southwest and Rocky Mountains regions. About half of the other SCIP materials listed on the questionnaire were for upper elementary, middle school and junior high sc. `~l grade levels; therefore, it was not surprising that teachers who felt that the lack of knowledge of science methods provided difficulty to the effective teaching of science in their schools were in schools where one of these SCIP programs was being taught.

Teacher Currently or Previously Had Taught SCIP Materials

This variable was generated from the Elementary Teacher Questionnaire. If any SCIP materials were listed by the sample teacher as currently being taught or one which they had previously taught, the variable was assigned a value of 1, otherwise it was assigned a value of 0. The mean values are given in Table 21. They ranged from a low of 0.13 in both the Great Lakes and Southeast regions to a high of 0.30 in the New England region. Overall the mean value was 0.17. This suggests that overall 17 percent of the sample teachers were teaching or had taught with SCIP materials although regionally the percent ranged from 13 to 30. In all regions, the percentage of teachers who had taught or were currently teaching SCIP materials was lower than the percentage of schools using SCIP materials. This would suggest that the principals did not purposely select teachers to complete the questionnaire who were in grades which were using SCIP materials.

The variable related to the teacher's current or previous teaching of SCIP materials resulted in significant ($\alpha \leq 0.001$) positive correlations with the following variables in at least four regions:

+Teacher attendance at a SCIP workshop or institute
+Use of special teacher, specialists or outside help for the teaching of science in grades 1, 2, 3, and 4
+Teacher use of individual laboratory activities as a frequent learning activity
+Teacher use of group laboratory activities as a frequent learning activity

The variable related to the teacher's current or previous teaching of SCIP materials resulted in significant ($\alpha \leq 0.001$) negative correlations with the following variable:

-Teacher use of lectures as a frequent learning activity

TABLE 20

SUMMARY OF STEPWISE REGRESSION ANALYSES FOR PREDICTION OF SCHOOL USE OF OTHER SCIENCE CURRICULUM IMPROVEMENT PROJECT (SCIP) MATERIALS

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 543	Restrict Var 27	81 Tch SCIP	0.22	0.05	0.05	0.22
	Restrict Var 23,24,25,27,81,82	None	----	----	----	----
Farwest N = 313	Restrict Var 27	24 ESS	0.24	0.06	0.06	0.24
	Restrict Var 23,24,25,27,81,82	None	----	----	----	----
New England N = 145	Restrict Var 27	21 Tch Per Std	0.47	0.23	0.23	0.47
		28 Spcl Sci Facil	0.53	0.28	0.06	0.30
	Restrict Var 23,24,25,27,81,82	21 Tch Per Std	0.47	0.23	0.23	0.47
		28 Spcl Sci Facil	0.53	0.28	0.06	0.30
Mideast N = 462	Restrict Var 27	None	----	----	----	----
	Restrict Var 23,24,25,27,81,82	None	----	----	----	----
Southwest N = 206	Restrict Var 27	54 Lack Sci Methods	0.24	0.06	0.06	0.24
	Restrict Var 23,24,25,27,81,82	54 Lack Sci Methods	0.24	0.06	0.06	0.24
Rocky Mountains N = 110	Restrict Var 27	02 Departmentalization	0.28	0.08	0.08	0.28
		20 Att TV/Radio Prog	0.35	0.12	0.04	-0.27
		54 Lack Sci Methods	0.42	0.18	0.06	0.10
	Restrict Var 23,24,25,27,81,82	02 Departmentalization	0.28	0.08	0.08	0.28
		20 Att TV/Radio Prog	0.35	0.12	0.04	-0.27
		54 Lack Sci Methods	0.42	0.18	0.06	0.10
Plains N = 282	Restrict Var 27	None	----	----	----	----
	Restrict Var 23,24,25,27,81,82	None	----	----	----	----
Southeast N = 614	Restrict Var 27	23 SCIS	0.21	0.05	0.05	0.21
	Restrict Var 23,24,25,27,81,82	None	----	----	----	----
Total U.S. N = 2576	Restrict Var 27	None	----	----	----	----
	Restrict Var 23,24,25,27,81,82	None	----	----	----	----

TABLE 21

MEANS[a] AND STANDARD DEVIATIONS FOR THE CURRENT OR PAST TEACHING OF ANY SCIENCE CURRICULUM IMPROVEMENT PROJECT (SCIP) BY THE TEACHER

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	.13	.18	.30	.18	.16	.24	.24	.13	.17
S.D.	.33	.39	.46	.39	.36	.43	.43	.33	.38
N	543	313	145	462	206	110	282	614	2675

[a]yes = 1, no = 0

Two stepwise regression analyses were made of the teacher variables related to the implementation of SCIP materials. In the first analysis all variables were allowed to enter the analysis whereas all dependent variables related to the implementation of SCIP materials were restricted from entering the second analysis. The results of the analysis on the teacher's current or previous teaching of SCIP materials are shown in Table 22. In all eight regions the best predictor of whether the teacher currently or previously had taught SCIP materials was whether the teacher had attended a SCIP workshop or institute. When implementation of SCIP materials variables were restricted from entering the regression analysis the best predictors of the current or previous teaching of SCIP materials were related to the use of laboratory activities as a frequent learning activity. The use of individual laboratory activities was the best predictor in the Mideast and Rocky Mountains regions while the use of group laboratory activities was the best predictor in all other regions and for the total sample.

Teacher Attendance at SCIP Workshops or Institutes

If the teachers indicated attendance at any SCIP workshop or institute this variable was assigned a value of 1, otherwise it was assigned a value of 0. The mean values are given in Table 23 and ranged from a low of 0.10 for the Great Lakes region to a high of 0.23 for the New England region. This implies that overall 14 percent of the elementary teachers had attended some SCIP workshop or institute and as many as 23 percent had attended from the New England region.

Teacher attendance at a SCIP workshop or institute yielded significant ($\alpha \leq 0.001$) positive correlations in at least four of the eight regions with the following variables:

+Schools where SCIS, ESS, SAPA and any SCIP materials were used
+Teacher who currently or previously had taught SCIP materials
+Use of special teacher, specialists or outside help for the teaching of science in grades 1, 2, and 3
+Teacher use of group laboratory activities as a frequent learning activity
+Teacher use of individual laboratory activities as a frequent learning activity

TABLE 22

SUMMARY OF STEPWISE REGRESSION ANALYSES FOR PREDICTION OF CURRENT OR PAST TEACHING OF ANY SCIENCE CURRICULUM IMPROVEMENT PROJECT (SCIP) BY THE TEACHER

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 543	All Var Free	82 Att SCIP Wrkshp/Inst	0.86	0.74	0.74	0.86
	Restrict Var 23-27,82	69 Lecture-Disc	0.24	0.06	0.06	-0.24
Farwest N = 313	All Var Free	82 Att SCIP Wrkshp/Inst	0.81	0.66	0.66	0.81
	Restrict Var 23-27,82	70 Group Lab	0.31	0.10	0.10	0.31
New England N = 145	All Var Free	82 Att SCIP Wrkshp/Inst	0.85	0.73	0.73	0.85
	Restrict Var 23-27,82	68 Indiv Lab	0.48	0.23	0.23	0.48
		30 Outside Help Tch Sci	0.54	0.29	0.06	0.35
Mideast N = 462	All Var Free	82 Att SCIP Wrkshp/Inst	0.87	0.76	0.76	0.87
	Restrict Var 23-27,82	70 Group Lab	0.26	0.07	0.07	0.26
Southwest N = 206	All Var Free	82 Att SCIP WrkshP/Inst	0.91	0.82	0.82	0.91
	Restrict Var 23-27,82	70 Group Lab	0.39	0.15	0.15	0.39
		72 Written Assign	0.47	0.22	0.07	-0.22
Rocky Mountains N = 110	All Var Free	82 Att SCIP WrkshP/Inst	0.87	0.76	0.76	0.87
	Restrict Var 23-27,82	68 Indiv Lab	0.27	0.07	0.07	0.27
		21 Tch Per Std	0.38	0.14	0.07	0.25
		79 TV Instr	0.44	0.19	0.05	-0.23
		14 Consult/Sup Help Tch	0.49	0.24	0.05	0.20
Plains N = 282	All Var Free	82 Att SCIP WrkshP/Inst	0.90	0.82	0.82	0.90
	Restrict Var 23-27,82	70 Group Lab	0.34	0.12	0.12	0.34
		68 Indiv Lab	0.42	0.18	0.06	0.30
Southeast N = 614	All Var Free	82 Att SCIP WrkshP/Inst	0.90	0.81	0.81	0.90
	Restrict Var 23-27,82	70 Group Lab	0.24	0.06	0.06	0.24
Total U.S. N = 2676	All Var Free	82 Att SCIP Wrkshp/Inst	0.88	0.77	0.77	0.88
	Restrict Var 23-27,82	70 Group Lab	0.29	0.08	0.08	0.29

TABLE 23

MEANS[a] AND STANDARD DEVIATIONS FOR THE TEACHER ATTENDANCE AT ANY SCIENCE CURRICULUM IMPROVEMENT PROJECT (SCIP) WORKSHOP OR INSTITUTE

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	.10	.13	.23	.15	.13	.21	.21	.11	.14
S.D.	.29	.33	.43	.35	.34	.41	.41	.32	.35
N	543	313	145	462	206	110	282	614	2675

yes = 1, no = 0

Teacher attendance at a SCIP workshop or institute yielded significant ($\alpha \leq 0.001$) negative correlations with the following variable:

-Teacher use of lecture-discussion as a frequent teaching method

The results of the two stepwise regression analyses are shown in Table 24. The single best predictor for all regions when all variables were allowed to enter the regression analysis was whether the teacher was currently teaching or previously had taught SCIP materials. The strong relationship between attendance at a SCIP workshop or institute and current or previous teaching of SCIP materials was very apparent since these two variables were each best predictors of the other when all variables were free to enter the regression analysis. It is not possible to imply a causal relationship between the two variables, but it is apparent that special training and teaching of SCIP materials were closely related.

The best predictor of the teacher attendance at a SCIP workshop or institute in all but the New England and Rocky Mountains regions when SCIP implementation variables were restricted from entering the regression analysis was the teacher use of group laboratory activities as a frequent learning activity. The teacher use of individual laboratory activities as a frequent learning activity was a significant predictor in the New England and Plains regions. The difficulty of offering effective science teaching in the school because of a lack of inservice opportunities was a significant predictor in the New England and Rocky Mountains regions. No other variables were consistent predictors of teacher attendance at SCIP workshops or institutes.

Summary

A summary for the dependent variables related to the implementation of Science Curriculum Improvement Project materials is given in Table 25. The percentages of sample schools using some SCIP materials, the percentages of sample teachers who currently or had previously taught SCIP materials and the percentage of sample teachers who had attended a SCIP workshop or institute are given in the table.

TABLE 24

SUMMARY OF STEPWISE REGRESSION ANALYSES FOR PREDICTION OF TEACHER ATTENDANCE AT ANY SCIENCE CURRICULUM IMPROVEMENT PROJECT (SCIP) WORKSHOP OR INSTITUTE

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 543	All Var Free	81 Tch SCIP	0.86	0.74	0.74	0.86
	Restrict Var 23-27,81	None	----	----	----	----
Farwest N = 313	All Var Free	81 Tch SCIP	0.81	0.66	0.66	0.81
	Restrict Var 23-27,81	70 Group Lab	0.25	0.06	0.06	0.25
New England N = 145	All Var Free	81 Tch SCIP	0.85	0.73	0.73	0.85
	Restrict Var 23-27,81	68 Ind Lab	0.42	0.18	0.18	0.42
		60 Lack Inserv Opp	0.49	0.24	0.06	-0.36
Mideast N = 462	All Var Free	81 Tch SCIP	0.87	0.76	0.76	0.87
	Restrict Var 23-27,81	70 Group Lab	0.22	0.05	0.05	0.22
Southwest N = 206	All Var Free	81 Tch SCIP	0.91	0.82	0.82	0.91
	Restrict 23-27,81	70 Group Lab	0.40	0.16	0.16	0.40
		72 Written Assign	0.46	0.21	0.05	-0.18
Rocky Mountains N = 110	All Var Free	81 Tch SCIP	0.87	0.76	0.76	0.87
	Restrict Var 23-27,81	21 Tch Per Std	0.28	0.08	0.08	0.28
		60 Lack Inserv Opp	0.38	0.14	0.06	-0.22
		48 Lack Room Fac	0.45	0.20	0.06	0.21
		44 Adequate Equipment	0.50	0.25	0.05	0.23
		73 Sci Demo	0.55	0.30	0.05	-0.16
Plains N = 282	All Var Free	81 Tch SCIP	0.90	0.82	0.82	0.90
	Restrict Var 23-27,81	70 Group Lab	0.33	0.11	0.11	0.33
Southeast N = 614	All Var Free	81 Tch SCIP	0.90	0.81	0.81	0.90
	Restrict Var 23-27,81	70 Group Lab	0.22	0.05	0.05	0.22
Total U.S. N = 2676	All Var Free	81 Tch SCIP	0.88	0.77	0.77	0.88
	Restrict Var 23-27,81	70 Group Lab	0.26	0.07	0.07	0.26

TABLE 25

PERCENTAGE OF SCHOOLS USING VARIOUS SCIENCE CURRICULUM IMPROVEMENT PROJECT (SCIP) MATERIALS

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
SCIS	3	6	12	6	4	15	8	2	5
ESS	5	5	20	11	5	20	11	3	8
SAPA	11	10	19	15	15	7	15	15	14
Other SCIP	8	6	7	5	2	13	10	7	7
Any SCIP	23	20	41	21	21	45	33	23	27
Tch SCIP	13	18	30	18	16	24	24	13	17
Att SCIP Wrkshp or Institute	10	15	23	15	13	21	21	11	14

The use of elementary SCIP materials was only about half that of the secondary school use of SCIP materials. Generally those regions which had low use of secondary SCIP materials similarly had low usage of elementary SCIP materials. The notable exception was the Farwest region which had a high use of secondary materials and a low use of elementary materials.

Of the three more widely publicized elementary SCIP materials, SAPA was the most commonly used, followed by ESS and SCIS. This pattern of usage was generally held for all regions except the Rocky Mountains region where the use of SAPA materials was much lower than might be expected. The Rocky Mountains region was the most unique of the eight regions in terms of SCIP usage. A part of this might be attributed to the smaller size of the sample of schools and teachers. Since the school use of any SCIP materials was generated from the use of specific SCIP materials, it is possible to conclude that at least 65 percent of the SCIP materials which were used in the schools were SCIS, ESS and SAPA materials. The percentage for the total sample of schools was at least 74 percent and probably higher. This percentage was based on the assumption that the schools using other SCIP materials were not using SCIS, ESS or SAPA materials. This was probably not true and would tend to make the percentage of sample schools using one, two or all three of these programs even higher than 74 percent.

In several regions (Mideast, Southeast, and Farwest) the regression analyses indicated the tendency for the schools to use materials from more than a single SCIP, particularly to use ESS with SAPA or with SCIS. This was not surprising since the SCIS and SAPA materials are more highly structured continuous programs whereas the ESS materials are organized around numerous discovery type units and activities which could be integrated into an ongoing program.

The close relationship between a teacher's current or prior teaching of a SCIP and attendance at a SCIP workshop or institute was revealed by the regression analyses and was further reflected by the similar percentages in Table 25. These results suggest that the teachers were being provided training for the teaching of SCIP materials. The regression analyses also revealed that schools using SCIP materials tended to provide consultant or specialist help for the teaching of science, particularly in the primary grades. In other words, the provision of support help was indicative of the school use of SCIP materials.

The use of group and individual laboratory activities as an important learning activity was predictive of both the school use of any SCIP materials and the teacher's current or previous use of SCIP materials. The laboratory activities were also predictive of the school use of several of the specific SCIP materials. This is particularly encouraging and suggests that the programs were being implemented along the philosophical lines of the developers with the importance of student laboratory activity being stressed.

Other School Programs, Materials and Practices

The Principal's Questionnaire contained information related to school offerings other than Science Curriculum Improvement Projects. Five variables related to other school offerings, school procedures and special facilities were selected for further analysis and discussion. In addition, a teacher variable related to the use of locally prepared materials was analyzed. The six variables included in this section for further analysis are:

School Offering of Narcotics or Drug Abuse Education
School Offering of Health Education
School Offering of Environmental and/or Conservation Science
Availability of Special Facilities for the Teaching of Environmental and/or Conservation Science
Use of Special Procedures to Identify Students With an Interest in Science
Teacher Use of Locally Prepared Materials for Teaching Science

School Offering of Narcotics or Drug Abuse Education

If narcotics or drug abuse education was offered either as a separate course or as a part of another course this variable was assigned a value of 2, otherwise it was assigned a value of 1. The mean values for the variable are given in Table 26. They ranged from a low of 1.73 in the Southeast region to a high of 1.90 in the Farwest region and was 1.80 overall. This indicates that overall about 80 percent of the sample schools were offering some narcotics or drug abuse education as a part of their curriculum. The only variable which correlated significantly ($\alpha \leq 0.001$) with the school offering of narcotics or drug abuse education in four or more regions was the school offering of environmental and/or conservation science. The correlation was positive.

TABLE 26

MEANS[a] AND STANDARD DEVIATIONS FOR THE SCHOOL OFFERING OF NARCOTICS OR DRUG ABUSE EDUCATION

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	1.80	1.90	1.76	1.84	1.78	1.84	1.78	1.73	1.80
S.D.	.40	.30	.43	.37	.41	.37	.42	.45	.40
N	512	299	143	457	199	97	272	573	2552

[a]yes = 2, no = 1

The stepwise regression analysis allowing all variables to freely enter the analysis revealed that the best predictor of the offering of narcotics or drug abuse education was the offering of environmental and/or conservation science. As shown in Table 27, it accounted for at least five percent of the variance in all but the Farwest and New England regions. One possible explanation for this strong relationship is that the environmental and/or conservation science courses consisted of more than nature and outdoor education materials and possibly the drug abuse and narcotics education was included as a part of the environmental or conservation science offering.

School Offering of Health Education

If health education was offered either as a separate offering or as a part of another course this variable was assigned a value of 1, otherwise it was assigned a value of 0. The mean values for the variable are given in Table 28. Overall, 42 percent of the sample schools offered some health education in their schools; the general range was from 30 to 50 percent with a high of 57 percent in the Farwest region. The notable exception was the Plains region where only 6 percent of the sample schools indicated that they offered any health education.

The correlation analysis revealed that there were no variables which correlated significantly with the school offering of health education in four or more regions. Similarly the stepwise regression as shown in Table 29, indicated that there were no significant predictors of the offering of health education across several regions.

School Offering of Environmental and/or Conservation Science

If the principal indicated that environmental and/or conservation science was offered in the school, this variable was assigned a value of 2, otherwise it was assigned a value of 1. The mean values as shown in Table 30, range from a low of 1.77 for the Southwest region to a high of 1.93 for the Farwest region and was 1.83 overall. This implies that between 77 and 93 percent of the sample schools, depending on the region, were offering some form of environmental and/or conservation science.

TABLE 27

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF SCHOOL OFFERING OF NARCOTICS OR DRUG ABUSE EDUCATION

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 522	All Var Free	11 Environ/Cons Sci	0.22	.05	0.05	0.22
Farwest N = 299	All Var Free	None	----	----	----	----
New England N = 143	All Var Free	04 Budget Sci Supplies	0.28	0.08	0.08	0.28
		70 Group Lab	0.35	0.13	0.05	0.25
Mideast N = 457	All Var Free	11 Environ/Cons Sci	0.24	0.06	0.06	0.24
Southwest N = 199	All Var Free	33 School Type I	0.34	0.11	0.11	-0.34
		11 Environ/Cons Sci	0.42	0.17	0.06	0.23
Rocky Mountains N = 97	All Var Free	11 Environ/Cons Sci	0.39	0.15	0.15	0.39
		03 Budget Sci Equipment	0.51	0.26	0.11	0.37
		41 Master's Program	0.58	0.34	0.08	-0.29
		16 Att Curr Dev & Revis	0.62	0.38	0.05	0.27
Plains N = 272	All Var Free	11 Environ/Cons Sci	0.22	0.05	0.05	0.22
Southeast N = 373	All Var Free	11 Environ/Cons Sci	0.28	0.08	0.08	0.28
Total U.S. N = 2552	All Var Free	11 Environ/Cons Sci	0.25	0.06	0.06	0.25

TABLE 28

MEANS[a] AND STANDARD DEVIATIONS FOR THE SCHOOL OFFERING OF HEALTH EDUCATION

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	.40	.57	.31	.41	.53	.31	.40	.40	.42
S.D.	.49	.50	.46	.49	.50	.47	.49	.49	.49
N	529	305	137	455	201	105	277	607	2616

[a]yes = 1, no = 0

TABLE 29

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF SCHOOL OFFERING OF HEALTH EDUCATION

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 529	All Var Free	None	----	----	----	----
Farwest N = 305	All Var Free	None	----	----	----	----
New England N = 137	All Var Free	11 Environ/Cons Sci	0.27	0.07	0.07	-0.27
Mideast N = 455	All Var Free	None	----	----	----	----
Southwest N = 201	All Var Free	69 Lecture-Disc	0.22	0.05	0.05	0.22
Rocky Mountains N = 105	All Var Free	45 Motion Pict Proj	0.23	0.05	0.05	-0.23
		05 Purchase Equip/Supplies	0.32	0.10	0.05	-0.17
Plains N = 277	All Var Free	None	----	----	----	----
Southeast N = 607	All Var Free	None	----	----	----	----
Total U.S. N = 2616	All Var Free	None	----	----	----	----

TABLE 30

MEANS[a] AND STANDARD DEVIATIONS FOR THE SCHOOL OFFERING OF ENVIRONMENTAL AND/OR CONSERVATION SCIENCE

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	1.82	1.93	1.90	1.84	1.77	1.86	1.86	1.77	1.83
S.D.	.38	.26	.30	.37	.42	.35	.35	.42	.37
N	524	301	138	450	192	101	265	564	2535

[a]Yes = 2, no = 1

The offering of environmental and/or conservation science correlated significantly ($\alpha \leq 0.001$) with the following variables:

+Availability of special facilities for environmental and/or conservation science
+School offering of narcotics or drug abuse education

In the stepwise regression analysis all variables were allowed to enter except the availability of special facilities for environmental and/or conservation science. The results shown in Table 31 indicate that in five of the regions and for the total sample the offering of narcotics or drug abuse education accounted for a significant amount of variance in the regression equation. No other variables consistently accounted for a significant amount of the variance.

Availability of Special Facilities for the Teaching of Environmental and/or Conservation Science

If any type of special facility was indicated this variable was given a value of 2, otherwise it was assigned a value of 1. The mean values are given in Table 32. They ranged from a low of 1.22 in the Southwest region to a high of 1.54 in the Farwest region. Overall the mean value was 1.40. In other words between 22 and 54 percent of the sample schools, depending on the region, provided some special facilities for the teaching of environmental and/or conservation science.

The provision of special facilities for the teaching of environmental and/or conservation science yielded significant ($\alpha \leq 0.001$) positive correlations with the following variables:

+School offering of environmental and/or conservation science
+Schools with outdoor laboratories
+Schools which provide consultant or supervisory help for the teaching of science

These significant correlations suggest that those schools which were offering conservation science tended to provide some special facilities for that purpose and quite possibly special help was provided to establish the offerings.

TABLE 31

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF SCHOOL OFFERING OF ENVIRONMENTAL AND/OR CONSERVATION SCIENCE

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 524	Restrict Var 12	13 Drug/Narc Educ	0.22	0.05	0.05	0.22
Farwest N = 301	Restrict Var 12	None	----	----	----	----
New England N = 138	Restrict Var 12	29 Health Educ	0.27	0.07	0.07	-0.27
		33 Type I School	0.36	0.13	0.06	-0.24
Mideast N = 450	Restrict Var 12	13 Drug/Narc Educ	0.24	0.06	0.06	0.24
Southwest N = 192	Restrict Var 12	13 Drug/Narc Educ	0.2[illegible]	0.05	0.05	0.23
Rocky Mountain N = 101	Restrict Var 12	13 Drug/Narc Educ	0.39	0.15	0.15	0.39
		08 Avail Equip. 1-3	0.47	0.22	0.07	0.32
		27 Any SCIP	0.54	0.29	0.07	-0.25
		26 Other SCIP	0.58	0.34	0.05	0.08
Plains N = 265	Restrict Var 12	03 Budget Sci Equipment	0.23	0.05	0.05	0.23
Southeast N = 564	Restrict Var 12	13 Drug/Narc Educ	0.28	0.08	0.08	0.28
		05 Purchase Equip/Suppl	0.36	0.13	0.05	0.25
Total U.S. N = 2535	Restrict Var 12	13 Drug/Narc Educ	0.25	0.06	0.06	0.25

TABLE 32

MEANS[a] AND STANDARD DEVIATIONS FOR THE AVAILABILITY OF SPECIAL FACILITIES FOR THE TEACHING OF ENVIRONMENTAL AND/OR CONSERVATION SCIENCE

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	1.43	1.54	[illegible].42	1.43	1.22	1.48	1.[illegible]	1.34	1.40
S.D.	.50	.50	.50	.50	.41	.50	.49	.47	.49
N	543	313	145	462	206	110	282	614	2675

[a]Yes = 2, no = 1

The results of the stepwise regression analysis on the availability of special facilities for environmental and/or conservation science are shown in Table 33. All variables except the school offering of environmental and/or conservation science were allowed to enter the analysis. No variables accounted for a significant amount of the variance in more than an individual region.

TABLE 33

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF SPECIAL FACILITIES FOR THE TEACHING OF ENVIRONMENTAL AND/OR CONSERVATION SCIENCE.

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 543	Restrict Var 11	None	----	----	----	----
Farwest N = 313	Restrict Var 11	16 Att Curr Dev & Revis	0.28	0.08	0.08	0.28
		51 Lack Community Supp	0.36	0.13	0.05	-0.21
New England N = [illegible]	Restrict Var 11	None	----	----	----	----
Mideast N = [illegible]62	Restrict Var 11	None	----	----	----	----
Southwest N = 226	Restrict Var 11	None	----	----	----	----
Rocky Mountains N = 110	Restrict Var 11	18 Att Sci Workshops	0.26	0.07	0.07	0.26
		70 Group Lab	0.35	0.12	0.05	0.18
Plains N = 282	Restrict Var 11	14 Consult/Sup Help Tch	0.23	0.06	0.06	0.23
Southeast N = 614	Restrict Var 11	None	----	----	----	----
Total U.S. N = 2676	Restrict Var 11	None	----	----	----	----

Use of Special Procedures to Identify Students With an Interest in Science

If the principal indicated that definite procedures were used to identify children with a special interest in science, the variable was assigned a value of 2, otherwise it was assigned a value of 1. The mean values are given in Table 34, and ranged from a low of 1.16 for the Farwest region to a high of 1.24 for the Southeast region. Overall the mean was 1.19. The regional variation was not great and indicated that only about 19 percent of the responding schools used definite procedures to identify children with a special interest in science.

TABLE 34

MEANS[a] AND STANDARD DEVIATIONS FOR THE USE OF SPECIAL PROCEDURES TO IDENTIFY STUDENTS WITH AN INTEREST IN SCIENCE

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	1.17	1.16	1.18	1.18	1.20	1.18	1.17	1.24	1.19
S.D.	.37	.37	.38	.38	.40	.39	.38	.43	.39
N	524	306	140	449	205	105	270	569	25[illegible]

[a]yes = 2, no = 1

The variable yielded significant ($\alpha \leq 0.001$) positive correlations in four or more regions with the following variables:

+Schools with an annual budget for science equipment
+Schools which use definite procedures to identify students with special interests and aptitudes

The stepwise regression analysis allowing all variables to enter revealed that in most regions there were no variables which accounted for a significant amount of the variance in the prediction equation. The results of the regression analysis are shown in Table 35. In the New England and Rocky Mountains regions a combination of variables accounted for a significant amount of the variance, but none of the variables were common to both regions.

Teacher Use of Locally Prepared Curriculum Materials for Teaching Science

The teacher use of locally prepared materials in teaching science was obtained from the Elementary Teacher Questionnaire. The variable was assigned a value of 1 if locally prepared materials were used, otherwise it was assigned a value of 0. The mean values are given in Table 36. The means ranged from a low of 0.23 in the Southwest region to a high of 0.39 in the Mideast region. Overall the mean was 0.30 indicating that about 30 percent of the responding sample teachers made some use of locally prepared curriculum materials in their science teaching.

TABLE 35

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF USE OF SPECIAL PROCEDURES TO IDENTIFY STUDENTS WITH AN INTEREST IN SCIENCE

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 52_	All Var Free	None	----	----	----	----
Farwest N = 305	All Var Free	None	----	----	----	----
New England N = 140	All Var Free	03 Budget Sci Equipment	0.30	0.09	0.09	0.30
		76 Prog Instr	0.40	0.16	0.07	0.29
		26 Other SCIP	0.46	0.21	0.05	0.26
Mideast N = 449	All Var Free	None	----	----	----	----
Southwest N = 205	All Var Free	None	----	----	----	----
Rocky Mountains N = 205	All Var Free	80 Satisfaction Tch Sci	0.27	0.07	0.07	0.27
		60 Lack Inserv Opp	0.35	0.12	0.05	0.09
		13 Drug/Narc Educ	0.41	0.17	0.05	0.22
Plains N = 270	All Var Free	None	----	----	----	----
Southeast N = 567	All Var Free	None	----	----	----	----
Total U.S. N = 2568	All Var Free	None	----	----	----	----

TABLE 36

MEANS[a] AND STANDARD DEVIATIONS FOR THE TEACHER USE
OF LOCALLY PREPARED MATERIALS

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	.26	.38	.35	.39	.23	.27	.24	.28	.30
S.D.	.44	.49	.48	.49	.42	.44	.43	.45	.46
N	533	307	141	449	201	105	273	577	2586

[a]yes = 1, no = 0

There were no variables which correlated significantly with the teacher use of locally prepared materials in four or more regions. Similarly, the stepwise regression analysis allowing all variables to enter did not reveal any variables which were predictive of the teacher use of locally prepared materials in more than a single region (Table 37).

Summary

The results of the analysis of the selected school program, materials and procedures variables yielded few significant findings.

About 80 percent of the schools provided a narcotics or drug abuse offering, but a much smaller percentage (40 percent) provided a health education offering. It is surprising that the offering of health education is not greater. The large percentage of schools offering drug abuse or narcotics education may be indicative of the increased usage of drugs by the school population.

About 80 percent of the schools provided an environmental or conservation science program. About 40 percent of the schools had some special facilities for environmental or conservation science and if one assumes that those with special facilities offer an environmental or conservation science program, it would suggest that about 50 percent of those offering environmental or conservation science courses had special facilities for use with these courses.

Only about 20 percent of the schools used some special procedures to identify students with a special interest in science.

About 30 percent of the teachers utilized some locally prepared materials which implies that most teachers and schools relied quite heavily on commercially prepared materials.

Few relationships were revealed between the variables by the correlation and regression analyses. Significant relationships were revealed between the school offering of environmental or conservation science and offering of narcotics or drug abuse education; between the offering of environmental or conservation science and the school provision of special

TABLE 37

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF TEACHER USE OF LOCALLY PREPARED MATERIALS

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 533	All Var Free	None	----	----	----	----
Farwest N = 307	All Var Free	79 TV Instr	0.25	0.06	0.06	0.25
New England N = 141	All Var Free	59 Lack Time	0.29	0.08	0.08	-0.29
Mideast N = 449	All Var Free	None	----	----	----	----
Southwest N = 201	All Var Free	None	- --	----	----	----
Rocky Mountains N = 105	All Var Free	46 Overhead Proj 17 Att Sci Courses	0.26 0.35	0.07 0.12	0.07 0.06	0.26 -0.25
Plains N = 273	All Var Free	None	----	----	----	----
Southeast N = 577	All Var Free	None	----	----	----	----
Total U.S. N = 2586	All Var Free	None	----	----	----	----

facilities for the offering of environmental or conservation science; and between the school use of special procedures to identify students with a special interest in science and the school use of procedures to identify students with special interests and aptitudes. The latter two relationships would be predicted and were not surprising. The essence of the relationship between the offering of environmental or conservation science and the offering of narcotics or drug abuse education is not as obvious.

Teacher Ranking of the Relative Use of Various Learning Activities

The sample teachers were asked to rank a number of learning activities according to the relative use made of them in the classroom. The learning activities included on the Elementary Teacher Questionnaire were:

Lecture
Lecture-Discussion
Small Group Discussion
Science Demonstrations
Instructional Films
Independent Study
Individual Laboratory Activities
Group Laboratory Activities
In-class Written Assignments
Excursions or Field Studies
Programmed Instruction
Auto-tutorial Instruction
Televised Instruction

The teachers were asked to rank in order, the three learning activities which they used most often and to check all others which were also used. The activity used most often by the teacher was assigned a value of 4, the next most often used activity was assigned a value of 3, the third most used activity was assigned a value of 2. All other learning activities used by the teacher were assigned a value of 1. Any activity not checked was assigned a value of 0.

All of the learning activities listed above were included in the correlational analyses and five of the learning activities were included in the stepwise regression analyses. The learning activities which are discussed in this section include:

Lecture-Discussion
Small Group Discussion
Science Demonstrations
Independent Study
Individual Laboratory Activities
Group Laboratory Activities
Excursions or Field Studies

The intercorrelations of the ranking of the learning activities were directly affected by the ranking process. If one activity was picked to be marked as "most often used" then that limited the responses the teacher could give for another activity. These responses were therefore not independent. This lack of independence leaves some question as to what the significance level for these intercorrelations is, but was considered significant if a level of significance ($\alpha \leq 0.001$) was reached in at least four of the eight regions.

Lecture-Discussion

The mean values for the teacher ranking of the relative use of lecture-discussion activities are given in Table 38. The means ranged from a low of 2.43 for the New England and Rocky Mountains regions to a high of 3.09 for the Great Lakes region. The overall mean was 2.72. The use of lecture-discussion activities received the highest use ranking of all the learning activities contained on the Elementary Teacher Questionnaire. This suggests that a majority of the teachers ranked the use of lecture-discussion as one of the three learning activities used most often in their teaching.

TABLE 38

MEANS[a] AND STANDARD DEVIATIONS FOR THE TEACHER RANKING OF THE RELATIVE USE OF LECTURE-DISCUSSION ACTIVITIES

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	3.09	2.64	2.43	2.48	2.73	2.42	2.64	2.79	2.72
S.D.	1.37	1.54	1.59	1.54	1.55	1.59	1.59	1.53	1.53
N	456	284	143	451	200	104	272	590	2500

[a]Most Often = 4 to Not Used = 0

The teacher ranking of the relative use of lecture-discussion as a learning activity resulted in significant positive correlations with the following variables:

+Use of a single textbook for teaching science
+Teacher use of in-class written assignments as a frequent learning activity

The relative use of lecture-discussion as a learning activity resulted in significant negative correlations with the following variables:

-School use of any SCIP materials
-Use of special teacher, specialist or outside help for the teaching of science in grades 2 and 3
-Teacher use of individual laboratory activities as a frequent learning activity
-Teacher use of group laboratory activities as a frequent learning activity
-Teacher use of small group discussion as a frequent learning activity
-Teacher currently or previously had taught a SCIP
-Teacher attendance at a SCIP workshop or institute

These correlations can be interpreted to mean that those teachers who made greater use of lecture-discussion as a learning activity were not as likely to be teachers of SCIP materials or in schools where SCIP materials were used. They tended to use individual and group laboratory activities and small group discussion less than other learning activities, such as in-class written assignments. The teachers who made greater use of lecture-discussion tended to be in schools where a single textbook was used for the teaching of science. The relative use of lecture-discussion as a learning activity was not included in the regression analyses.

Small Group Discussion

The mean values, as shown in Table 39, for the teacher ranking of the relative use of small group discussion activities ranged from a low of 0.74 for the Rocky Mountains region to a high of 1.37 for the Great Lakes region. The overall mean ranking was 1.10. The mean rankings suggest that most teachers made some use of small group discussion.

TABLE 39

MEANS[a] AND STANDARD DEVIATIONS FOR THE TEACHER RANKING OF THE RELATIVE USE OF SMALL GROUP DISCUSSION ACTIVITIES

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	1.37	1.13	1.11	.[illegible]7	1.08	.74	.98	1.18	1.10
S.D.	1.36	1.24	1.34	1.24	1.36	1.13	1.27	1.35	1.31
N	327	236	143	451	200	104	272	589	2322

[a]Most Often = 4 to Not Used = 0

The teacher ranking of the relative use of small group discussion as a learning activity resulted in significant positive correlations with the following variables:

+Teacher use of excursions or field studies as a frequent learning activity
+Teacher use of independent study as a frequent learning activity
+Teacher use of auto-tutorial instruction as a frequent learning activity

The relative use of small group discussion resulted in significant negative correlation with the following variable:

-Teacher use of lecture-discussion as a frequent learning activity

The results of the stepwise regression analysis in which all variables were allowed to freely enter are shown in Table 40. The best predictor of the use of small group discussion for five of the regions and for the total sample was the relative use of excursions or field studies. The teacher use of auto-tutorial instruction was also a significant predictor for four

TABLE 40

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF TEACHER RANKING OF THE RELATIVE USE OF SMALL GROUP DISCUSSION ACTIVITIES

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 327	All Var Free	78 Auto-Tut Instr	0.35	0.12	0.12	0.35
Farwest N = 236	All Var Free	74 Excur/Field Trips	0.32	0.10	0.10	0.32
New England N = 143	All Var Free	78 Auto-Tut Instr	0.30	0.09	0.09	0.30
Mideast N = 451	All Var Free	74 Excur/Field Trips	0.26	0.07	0.07	0.26
		69 Lecture-Disc	0.35	0.12	0.05	-0.26
Southwest N = 200	All Var Free	78 Auto-Tut Instr	0.32	0.10	0.10	0.32
		69 Lecture-Disc	0.40	0.16	0.05	-0.23
Rocky Mountains N = 104	All Var Free	78 Auto-Tut Instr	0.37	0.13	0.13	0.37
		21 Tch Per Std	0.47	0.22	0.09	0.29
		74 Excur/Field Trips	0.53	0.28	0.05	0.34
		08 Avail Equip. 1-3	0.59	0.34	0.06	0.30
Plains N = 272	All Var Free	69 Lecture-Disc	0.26	0.07	0.07	-0.26
		74 Excur/Field Trips	0.35	0.12	0.06	0.25
Southeast N = 586	All Var Free	74 Excur/Field Trips	0.24	0.06	0.06	0.24
Total U.S. N = 2350	All Var Free	74 Excur/Field Trips	0.27	0.07	0.07	0.27

of the regions. The use of lecture-discussion was a significant predictor for three regions, but only in the sense that those teachers who made greater use of lecture-discussion tended to use small group discussion to a lesser extent.

Sample teachers who made greater use of small group discussion also tended to make greater use of excursions or field studies and auto-tutorial instruction and less use of lecture-discussion learning activities with their students.

Science Demonstrations

The mean values, as shown in Table 41, for the teacher ranking of the relative use of science demonstrations ranged from a low of 1.81 for the New England region to a high of about 2.20 for the Great Lakes and Mideast regions. Overall the mean ranking was 2.05. The mean ranking value for the use of science demonstrations was the second highest of all the learning activities. Lecture-discussion was the only activity which was ranked higher by the elementary teachers as a frequently used learning activity.

TABLE 41

MEANS[a] AND STANDARD DEVIATIONS FOR THE TEACHER RANKING OF THE RELATIVE USE OF SCIENCE DEMONSTRATIONS

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	2.20	1.89	1.81	2.22	2.11	1.89	1.94	2.01	2.05
S.D.	1.28	1.27	1.37	1.33	1.29	1.31	1.20	1.31	1.30
N	422	282	143	451	200	104	272	590	2464

[a]Most Often = 4 to Not Used = 0

The use of science demonstrations as a frequent learning activity did not correlate significantly with any other variables and was not included in the regression analyses.

Independent Study

The mean values for the teacher ranking of the relative use of independent study activities ranged from a low of about 1.00 in the New England, Mideast, Southwest, and Plains regions to a high of 1.36 in the Farwest region. The overall mean ranking was 1.13. The mean values are given in Table 42. The mean rankings suggest that most teachers made some use of independent study activities.

TABLE 42

MEANS[a] AND STANDARD DEVIATIONS FOR THE TEACHER RANKING OF THE RELATIVE USE OF INDEPENDENT STUDY ACTIVITIES

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	1.23	1.36	1.03	1.00	1.02	1.29	1.04	1.14	1.13
S.D.	1.27	1.31	1.24	1.18	1.06	1.34	1.25	1.20	1.23
N	336	258	143	451	200	104	272	586	2350

[a]Most often = 4 to Not used = 0

The teacher ranking of the relative use of independent study as a learning activity resulted in significant positive correlations with the following variables:

+Teacher use of lecture as a frequent learning activity
+Teacher use of individual laboratory activities as a frequent learning activity
+Teacher use of small group discussion as a frequent learning activity
+Teacher use of in-class written assignments as a frequent learning activity
+Teacher use of excursions or field studies as a frequent learning activity
+Teacher use of auto-tutorial instruction as a frequent learning activity

The results of the stepwise regression analysis in which all variables were allowed to freely center are shown in Table 43. The regression analysis indicated that the best predictor of the use of independent study for four of the regions and the total sample was the use of auto-tutorial instruction. The combination of the use of excursions and field studies and the availability of equipment in grades 1-3 was the best predictor in two other regions. Several other variables were significant predictors, but in only one region. In many cases auto-tutorial instruction is almost synonymous with independent study, therefore it is not surprising that the two were so highly correlated for the sample teachers.

Individual Laboratory Activities

The mean values as shown in Table 44, for the teacher ranking of the relative use of individual laboratory activities ranged from a low of 0.59 for the Southeast region to a high of 1.41 in the Great Lakes region. The overall mean ranking was 0.88. The mean rankings suggest that a sizeable number of teachers, at least 49 percent in one region, did not make use of individual laboratory activities in their teaching of science.

The teacher ranking of the relative use of individual laboratory activities resulted in significant positive correlations with the following variables:

+School use of any SCIP materials
+Teacher currently or previously had taught a SCIP

TABLE 43

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF TEACHER RANKING OF THE RELATIVE USE OF INDEPENDENT STUDY ACTIVITIES

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 336	All Var Free	78 Auto-Tut Instr	0.37	0.14	0.14	0.37
Farwest N = 258	All Var Free	78 Auto-Tut Instr	0.36	0.13	0.13	0.36
New England N = 143	All Var Free	78 Auto-Tut Instr	0.41	0.17	0.17	0.41
Mideast N = 451	All Var Free	78 Auto-Tut Instr	0.23	0.05	0.05	0.23
Southwest N = 200	All Var Free	74 Excur/Field Trip	0.43	0.19	0.19	0.43
		08 Avail Equip, 1-3	0.49	0.24	0.05	-0.22
Rocky Mountains N = 104	All Var Free	74 Excur/Field Trip	0.34	0.12	0.12	0.34
		65 Mult Text	0.46	0.21	0.09	0.34
		08 Avail Equip, 1-3	0.52	0.27	0.06	0.23
Plains N = 272	All Var Free	67 Lecture	0.26	0.07	0.07	0.26
Southeast N = 586	All Var Free	72 Written Assign	0.29	0.08	0.08	0.29
Total U.S. N = 2350	All Var Free	78 Auto-Tut Instr	0.28	0.08	0.08	0.18

TABLE 44

MEANS[a] AND STANDARD DEVIATIONS FOR THE TEACHER RANKING OF THE RELATIVE USE OF INDIVIDUAL LABORATORY ACTIVITIES

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	1.41	.98	.89	.91	.65	1.08	.86	.59	.88
S.D.	1.49	1.23	1.31	1.28	1.07	1.38	1.19	1.00	1.24
N	293	243	143	451	200	104	272	585	2291

[a] Most Often = 4 to Not Used = 0

+Teacher attendance at a SCIP workshop or institute
+Teacher use of group laboratory activities as a frequent learning activity
+Teacher use of excursions or field studies as a frequent learning activity
+Teacher use of programmed instruction as a frequent learning activity
+Teacher use of independent study activities as a frequent learning activity
+Teacher use of auto-tutorial instruction as a frequent learning activity
+Teacher satisfaction with teaching science

A significant negative correlation was obtained with the following variable:

-Teacher use of lecture-discussion as a frequent learning activity

The results of the stepwise regression analysis in which all variables were allowed to freely enter are shown in Table 45. The analysis indicated that there was no best predictor of the use of individual laboratory activities for all regions. Teachers who currently or previously had taught SCIP materials was the best predictor in the Farwest, New England, and Plains regions. The school use of ESS materials was the best predictor in the Rocky Mountains region. Use of group laboratory activities was a significant predictor of individual laboratory activities in three regions and for the total sample. The use of auto-tutorial instruction was a significant predictor in three regions and for the total sample while the use of programmed instruction was a significant predictor in one region. In both auto-tutorial instruction and programmed instruction students often work individually and it is not surprising that individual laboratory activities were closely related to these. In three regions, the use of excursions or field studies was predictive of the use of individual laboratory activities. Finally the lack of the use of lecture-discussion was predictive of the use of individual laboratory activities. Sample teachers making more use of lecture-discussion were less likely to use individual laboratory activities.

Group Laboratory Activities

The mean values for the teacher ranking of the relative use of group laboratory activities ranged from a low of 0.97 for the Southeast region to a high of 1.83 for the Great Lakes region. The overall mean ranking was 1.41. The mean values are shown in Table 46. The mean rankings suggest that most teachers made use of group laboratory activities and for some it was one of the more frequently used learning activities.

The teacher ranking of the relative use of group laboratory activities as a learning activity resulted in significant positive correlations with the following variables:

+School use of any SCIP materials
+Teacher currently or previously had taught a SCIP

TABLE 45

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF TEACHER RANKING OF THE RELATIVE USE OF INDIVIDUAL LABORATORY ACTIVITIES

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 293	All Var Free	76 Prog Instr	0.49	0.24	0.24	0.49
Farwest N = 243	All Var Free	74 Excur/Field Trip	0.34	0.11	0.11	0.34
		81 Tch SCIP	0.40	0.16	0.05	0.23
New England N = 143	All Var Free	81 Tch SCIP	0.48	0.23	0.23	0.48
		78 Auto-Tut Instr	0.59	0.35	0.13	0.41
		69 Lecture-Disc	0. 5	0.42	0.06	-0.34
Mideast N = 451	All Var Free	69 Lecture-Disc	0.27	0.07	0.07	-0.27
		78 Auto-Tut Instr	0.39	0.16	0.08	0.2[illegible]
Southwest N = 200	All Var Free	70 Group Lab	0.45	0.20	0.20	0.45
		74 Excur/Field Trip	0.53	0.28	0.08	0.40
Rocky Mountains N = 104	All Var Free	24 ESS	0.54	0.29	0.29	0.54
		70 Group Lab	0.59	0.35	0.06	0.25
		69 Lecture-Disc	0.63	0.40	0.05	-0.37
		78 Auto-Tut Instr	0.67	0.45	0.05	0.30
Plains N = 272	All Var Free	81 Tch SCIP	0.30	0.09	0.09	0.30
		74 Excur/Field Trip	0.38	0.15	0.06	0.27
		75 Instruc Film	0.45	0.20	0.05	-0.20
Southeast N = 585	All Var Free	70 Group Lab	0.48	0.23	0.23	0.48
Total U.S. N = 2291	All Var Free	70 Group Lab	0.34	0.11	0.11	0.34
		78 Auto-Tut Instr	0.41	0.17	0 05	0.29

TABLE 46

MEANS[a] AN[illegible] [illegible]RD DEVIATIONS FOR THE TEACHER RANKING OF THE [illegible]E USE OF GROUP LABORATORY ACTIVITIES

	Great Lakes	Fa[illegible]	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	1 51	1.57	1 61	1.49	1 30	1.34	1.52	97	1 41
S.D.	1 41	1 47	1.59	1 49	1 39	1.52	1.52	1.30	1.46
N	363	268	143	451	200	104	272	591	2392

[a]Most Often = 4 to Not Used = 0

+Teacher attendance at a SCIP workshop or institute
+Adequate equipment available for teaching science
+Teacher use of individual laboratory activities as a frequent learning activity
+Teacher use of excursions or field studies as a frequent learning activity
+Teacher use of auto-tutorial instruction as a frequent learning activity
+Teacher satisfaction with teaching science

A significant negative correlation resulted between the use of group laboratory activities and the following variables:

-Use of a single textbook for the teaching of science
-Teacher use of lecture-discussion as a frequent learning activity

The correlation pattern for group laboratories was very similar to that obtained from the analysis of the use of individual laboratory activities with almost all the same variables correlating with each of the laboratory variables.

The results of the stepwise regression analysis in which all variables were allowed to freely enter are shown in Table 47. As was the case with the use of individual laboratory activities, there were several consistent predictors of the use of group laboratory activities. The use of individual laboratory activities was a significant predictor for four of the regions and for the total sample. Since the use of group laboratory activities was also a significant predictor of the use of individual laboratory activities it appears that the use of individual and group laboratory activities were generally jointly used by the sample teachers although as the mean ratings given earlier showed, the use of individual laboratory activities was somewhat less than that of group laboratory activities. The teacher currently teaching or having previously taught SCIP materials was also predictive of the use of group laboratory activities as it had been in the case for the use of individual laboratory activities. It appears that those teachers who utilized or had utilized SCIP materials recognized the importance of the laboratory emphasis of these programs and for science teaching in general and were making more extensive use of laboratory activities in their teaching. The use of excursions or field studies was predictive of group laboratory activities in three regions. In many respects, an excursion or field study is similar to a group laboratory so it was not surprising that these two variables were highly correlated. The use of auto-tutorial instruction accounted for a significant amount of the variance in the regression equation for two regions. The teacher use of a single textbook for teaching science was predictive of the lack of the use of group laboratory activities for two regions. Those teachers in the Mideast and Plains regions who used a single textbook for teaching science tended not to use group laboratory activities.

Although not a significant predictor in every region, the best overall predictor of the use of group laboratory activities by the sample teachers was whether the teacher currently or previously had taught SCIP materials.

TABLE 47

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF TEACHER RANKING OF THE RELATIVE USE OF GROUP LABORATORY ACTIVITIES

Region		Variable Number and Abbreviati	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 363	All Var Free	78 Auto-Tut Instr	0.32	0.10	0.10	0.32
Farwest N = 268	All Var Free	81 Tch SCIP	0.31	0.10	0.10	0.31
		78 Auto-Tut Instr	0.41	0.17	0.07	0.27
New England N = 143	All Var Free	68 Indiv Lab	0.41	0.17	0.17	0.41
		51 Lack Community Supp	0.50	0.25	0.09	-0.37
		74 Excur/Field Trips	0.55	0.30	0.05	0.38
Mideast N = 451	All Var Free	81 Tch SCIP	0.26	0.07	0.07	0.26
		63 Single Text	0.35	0.12	0.05	-0.25
Southwest N = 200	All Var Free	68 Indiv Lab	0.46	0.20	0.20	0.45
		82 Att SCIP Wrkshp/Inst	0.57	0.32	0.12	0.40
Rocky Mountains N = 164	All Var Free	68 Indiv Lab	0.45	0.20	0.20	0.45
		74 Excur/Field Trips	0.52	0.27	0.07	0.30
		18 Att Sci Workshops	0.57	0.32	0.05	-0.19
		64 Separ Lab Mani	0.61	0.37	0.05	0.35
		27 Any SCIP	0.65	0.42	0.05	0.34
Plains N = 272	All Var Free	81 Tch SCIP	0.34	0.12	0.12	0.34
		03 Budget Sci Equipment	0.43	0.18	0.07	0.30
		63 Single Text	0.48	0.23	0.05	-0.26
Southeast N = 386	All Var Free	68 Indiv Lab	0.48	0.23	0.23	0.48
		74 Excur/Field Trips	0.53	0.28	0.05	0.36
Total U.S. N = 2330	All Var Free	68 Indiv Lab	0.34	0.11	0.11	0.34
		81 Tch SCIP	0.40	0.16	0.05	0.39

Excursions or Field Studies

The mean values, as shown in Table 48, for the teacher ranking of the relative use of excursions or field studies ranged from a low of 0.54 for the Southwest region to a high of 0.74 for the Great Lakes, Farwest, and Rocky Mountains regions. The overall mean ranking was 0.65. The mean rankings indicated that a sizeable number of the sample teachers did not use excursions or field studies as a learning activity. Overall this was true for at least 35 percent of the sample teachers.

TABLE 48

MEANS[a] AND STANDARD DEVIATIONS FOR THE TEACHER RANKING OF THE RELATIVE USE OF EXCURSIONS OR FIELD STUDIES

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	.74	.74	.69	.63	.54	.74	.58	.63	.65
S.D.	.94	.91	.96	.89	.84	.86	.75	.86	.88
N	285	245	143	451	200	104	272	590	2290

[a]Most Often = 4 to Not Used = 0

The teacher ranking of the relative use of excursions or field studies as a learning activity resulted in significant positive correlations with the following variables:

+Outdoor laboratory facilities
+Teacher use of individual laboratory activities as a frequent learning activity
+Teacher use of group laboratory activities as a frequent learning activity
+Teacher use of small group discussion as a frequent learning activity
+Teacher use of in-class written assignments as a frequent learning activity
+Teacher use of lecture as a frequent learning activity
+Teacher use of instructional films as a frequent learning activity
+Teacher use of independent study as a frequent learning activity
+Teacher use of auto-tutorial instruction as a frequent learning activity
+Teacher use of televised instruction as a frequent learning activity

There were no variables which gave significant negative correlations with the use of excursions or field studies.

The results of the stepwise regression analysis in which all variables were allowed to freely enter are shown in Table 49. The use of auto-tutorial instruction accounted for a significant amount of variance in the prediction equation for six of the eight regions. The use of group laboratory activities was a significant predictor for four regions. The combination of these

TABLE 49

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF TEACHER RANKING OF THE RELATIVE USE OF EXCURSIONS OR FIELD STUDIES

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 285	All Var Free	None	----	----	----	----
Farwest N = 245	All Var Free	78 Auto-Tut Instr	0.48	0.23	0.23	0.48
		21 Tch Per Std	0.54	0.29	0.06	0.23
		76 Prog Instr	0.58	0.34	0.05	0 44
New England N = 143	All Var Free	78 Auto-Tut Instr	0.51	0.26	0.26	0 51
		70 Group Lab	0.59	0.35	0.09	0.33
Mideast N = 451	All Var Free	78 Auto-Tut Instr	0.29	0.09	0.09	0.29
Southwest N = 200	All Var Free	78 Auto-Tut Instr	0.53	0.28	0.28	0.53
		77 Indep Study	0.58	0.34	0.06	0.43
Rocky Mountains N = 104	All Var Free	78 Auto-Tut Instr	0.38	0.14	0.14	0.38
		47 Phonograph	0.48	0.23	0.09	0.31
		72 Written Assign	0.55	0.31	0.08	0.37
		71 Small Group Disc	0.60	0.36	0.05	0.34
		70 Group Lab	0.64	0.41	0.05	0.30
Plains N = 272	All Var Free	68 Indiv Lab	0.27	0.08	0.08	0.27
		75 Instruc Films	0.36	0 13	0.06	0.18
		70 Group Lab	0.42	0.18	0.05	0.22
Southeast N = 590	All Var Free	78 Auto-Tut Instr	0.38	0 14	0.14	0.38
		70 Group Lab	0.46	0.21	0.07	0.36
		75 Instruc Films	0.52	0.27	0.06	0.30
Total U.S. N = 2290	All Var Free	78 Auto-Tut Instr	0.39	0.15	0.15	0.39

two variables was a significant predictor for three of the eight regions. Other variables were significant predictors for individual regions, but not on a consistent basis.

Summary

A summary of the mean values for the variables dealing with the relative use of the learning activities discussed in this section is given in Table 50.

TABLE 50

MEAN RANKING FOR THE RELATIVE USE OF VARIOUS LEARNING ACTIVITIES

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Lecture-Discussion	3.09	2.64	2.43	2.48	2.73	2.42	2.64	2.79	2.72
Small Group Discussion	1.37	1.13	1.11	0.97	1.08	0.74	0.93	1.18	1.10
Science Demonstrations	2.20	1.89	1.81	2.22	2.11	1.89	1.94	2.01	2.05
Independent Study	1.23	1.36	1.03	1.00	1.02	1.29	1.04	1.14	1.13
Individual Laboratory	1.41	0.98	0.89	0.91	0.65	1.08	0.86	0.59	0.89
Group Laboratory	1.83	1.57	1.61	1.49	1.30	1.34	1.52	0.97	1.41
Excursions or Field Studies	0.74	0.74	0.69	0.63	0.54	0.74	0.53	0.63	0.65

*Most Often = 4 to Not Used = 0

The interdependence of the ranking method for the various learning activities would tend to produce lower mean values for the more frequently used activities than their actual use would be, but the relative ranking should be about the same.

From these results it would appear that the sample teachers made the most frequent use of lecture discussion, science demonstrations and group laboratory activities for the teaching of science in the elementary schools. The standard deviations for all of these rankings were relatively large, generally ranging from 1.0 to about 1.5. This would indicate a great deal of deviation within the regions and within any one learning activity.

Of the other learning activities included on the Elementary Teacher Questionnaire, the only one which had considerable usage was that of instructional films, ranking about fourth. The use of in-class written assignments was about the same as the use of individual laboratory activities while lecture, TV instruction, programmed instruction and auto-tutorial activities were the least used by the sample teachers as learning activities.

The learning activities discussed in this section were highly intercorrelated. The relative use of independent study, excursions or field studies, small group discussion, individual and group laboratory activities formed a cluster of positively correlated variables. The use of lecture discussion was negatively correlated with group and individual laboratory and small group discussion activities.

The use of science demonstrations, although frequently used, was not significantly correlated with any other variables.

Teachers who made more frequent use of lecture discussion activities tended to use group and individual laboratory activities and small group discussion less frequently than other teachers.

Teachers who made more frequent use of laboratory activities tended to have been teachers who were teaching or previously had taught SCIP materials. These teachers also tended to make more frequent use of excursions or field studies.

Teacher Responsibility for and Satisfaction with Teaching Science

Two variables from the Elementary Teacher Questionnaire, one related to the role or responsibility of the sample teacher for the teaching of science in the classroom and the other regarding the degree of satisfaction felt by the sample teacher for teaching elementary science are reported in this section.

Teacher Role or Responsibility for Teaching Science

If the teacher was solely responsible for the teaching of elementary science without any outside help from a specialist or consultant the variable was assigned a value of 1. If specialist or consultant help was provided or the teacher served as a special science teacher for others the variable was assigned a value of 2. The mean values for the variable are given in Table 51. They ranged from a low of 1.42 for the Farwest region to a high of 1.51 for the Mideast region. The overall mean value was 1.46. There was not a great deal of variation between the regions which indicated that about 55 percent of the responding teachers were specialists themselves or were provided some specialist or consultant help for the teaching of science in their classrooms.

TABLE 51

MEANS[a] AND STANDARD DEVIATIONS FOR THE TEACHER'S ROLE IN CLASS

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	1.46	1.42	1.47	1.51	1.43	1.46	1.46	1.45	1.46
S.D.	50	.50	.50	.50	.50	.50	.50	.50	.50
N	525	299	126	403	178	108	261	574	2474

[a]yes = 2, no = 1

The role or responsibility of the teacher for teaching science resulted in significant positive correlations in at least four of the eight regions with the following variables:

+School use of departmentalization for science teaching
+Provision of consultant or supervisory help to teacher for teaching science
+Schools which tended to adopt a single textbook for grades K-6
+Schools which had special facilities for the teaching of science
+Use of special teacher, specialists or outside help for the teaching of science in grades K-6
+Teacher satisfaction with teaching science

The variable resulted in significant negative correlations with the following variables:

-Degree of difficulty that insufficient supplies and equipment offered to effective science teaching in school
-Degree of difficulty that the lack of consultant help offered to effective science teaching in the school
-Degree of difficulty that insufficient in-service opportunities offered to effective science teaching in the school

Sample teachers who were specialists or who were provided with specialist or consultant help for teaching science tended not to perceive any great difficulty that insufficient supplies and equipment, the lack of consultant help, or insufficient in-service opportunities offered to effective science teaching in their school.

The results of the stepwise regression analysis allowing all variables to freely enter are shown in Table 52. The best predictor of the teacher's role in all regions was whether there was consultant or supervisory help for teaching science within the school system. In actuality the two variables measured almost the same thing except that one variable was completed by the principal and the other by the teacher. One should be the best predictor of the other, as was the case. The teacher perception that the lack of consultant help was not a great difficulty in offering an effective science program was also a significant predictor variable in six of the eight regions. In other words those who were provided with consultant help did not perceive the lack of it as a problem and those who did not receive consultant help perceived that the lack of consultant help made it very difficult for them to offer effective science teaching. Teacher satisfaction for teaching elementary school science was a significant predictor of the teacher's role in two regions, the Farwest and New England. Those who were provided with consultant and supervisory help tended to be more satisfied with the teaching of elementary science. There were several other significant individual predictors, but none of which showed up consistently across several regions.

Teacher Satisfaction with Teaching Elementary School Science

The teachers were asked to rank on a 5-point scale from "very satisfied" (5) to "very dissatisfied" (1), how satisfied they were with teaching

TABLE 52

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF TEACHER'S ROLE IN CLASS

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes N = 525	All Var Free	30 Outside Help Tch Sci	0.43	0.19	0.19	0.43
Farwest N = 299	All Var Free	30 Outside Help Tch Sci	0.47	0.22	0.22	0.47
		79 TV Instr	0.51	0.26	0.04	0.19
		80 Satisfaction Tch Sci	0.55	0.31	0.05	0.30
New England N = 126	All Var Free	30 Outside Help Tch Sci	0.55	0.31	0.31	0.55
		55 Lack Consultant Supp	0.62	0.39	0.09	-0.49
		80 Satisfaction Tch Sci	0.66	0.44	0.05	0.46
Mideast N = 403	All Var Free	30 Outside Help Tch Sci	0.53	0.29	0.29	0.53
		55 Lack Consultant Supp	0.60	0.36	0.07	-0.37
Southwest N = 178	All Var Free	30 Outside Help Tch Sci	0.35	0.12	0.12	0.35
		55 Lack Consultant Supp	0.44	0.20	0.07	-0.33
Rocky Mountains N = 108	All Var Free	30 Outside Help Tch Sci	0.51	0.26	0.26	0.51
		55 Lack Consultant Supp	0.57	0.33	0.06	-0.45
Plains N = 261	All Var Free	30 Outside Help Tch Sci	0.41	0.17	0.17	0.41
		55 Lack Consultant Supp	0.48	0.23	0.06	-0.36
Southeast N = 574	All Var Free	55 Lack Consultant Supp	0.31	0.09	0.09	-0.31
		79 TV Instr	0.42	0.18	0.08	0.23
		30 Outside Help Tch Sci	0.49	0.24	0.06	0.29
Total U.S. N = 2474	All Var Free	30 Outside Help Tch Sci	0.42	0.18	0.18	0.42
		55 Lack Consultant Supp	0.48	0.23	0.06	-0.34

elementary science. The mean values for the sample teachers' responses are given in Table 53. They ranged from a low of 3.45 for the Farwest region to a high of 3.74 for the Mideast region. Overall the mean was 3.64. All of the mean values fell between neutral (3) and satisfied (4). Although the mean values may seem low, it is not surprising and perhaps should be viewed quite favorably since most elementary school teachers are not science majors, but rather receive training in a wide variety of subjects and areas. Overall it is encouraging that the sample teachers were reasonably satisfied with their role in teaching elementary science.

TABLE 53

MEANS[a] AND STANDARD DEVIATIONS FOR TEACHER SATISFACTION WITH TEACHING SCIENCE

	Great Lakes	Farwest	New England	Mideast	Southwest	Rocky Mountains	Plains	Southeast	Total U.S.
Mean	3.59	3.45	3.71	3.74	3.65	3.64	3.65	3.69	3.64
S.D.	1.18	1.15	1.15	1.05	1.02	1.15	1.00	1.04	1.09
N	536	303	143	453	203	107	279	598	2622

[a]Very Satisfied = 5 to Very Dissatisfied = 1

The degree of satisfaction with teaching elementary science resulted in significant positive correlations with the following variables in at least four regions.

+School use of departmentalization for teaching science
+Schools with a higher number of full time male teachers employed
+Use of special teacher, specialists or outside help for the teaching of science in grades 5 and 6
+Schools which had special facilities for the teaching of science
+Adequate supplies and equipment for science demonstrations and experiments
+Teachers who tend to use the overhead projector
+Classes which spend more time per week on science
+Teacher use of individual laboratory activities as a frequent learning activity
+Teacher use of group laboratory activities as a frequent learning activity
+Teacher role or responsibility for teaching science

Teacher satisfaction yielded significant negative correlations with the following variables:

-Degree of difficulty that inadequate room facilities offer to effective science teaching in the school
-Degree of difficulty that insufficient funds offer to effective science teaching in the school
-Degree of difficulty that insufficient supplies and equipment offer to effective science teaching in the school
-Degree of difficulty that lack of community support offered to effective science teaching in the school

- -Degree of difficulty that teacher lack of ability to improvise materials and equipment offered to effective science teaching in the school
- -Degree of difficulty that lack of teacher science knowledge offered to effective science teaching in the school
- -Degree of difficulty that lack of science methods offered to effective science teaching in the school
- -Degree of difficulty that lack of consultant support offered to effective science teaching in the school
- -Degree of difficulty that lack of teacher interest offered to effective science teaching in the school
- -Degree of difficulty that low importance placed on science offered to effective science teaching in the school
- -Degree of difficulty that insufficient time offered to effective science teaching in the school
- -Degree of difficulty that insufficient in-service opportunities offered to effective science teaching in the school

The more satisfied teachers were less likely to perceive factors which might be considered as causing difficulties with teaching elementary science, whereas the less satisfied teachers were more likely to suggest factors which were felt to offer difficulties in teaching elementary school science.

The cluster of variables which correlated positively with teacher satisfaction generally reflected conditions that were indicative of teachers who felt comfortable teaching science, utilizing laboratories and more science per week, and were provided with support help in terms of consultants or specialists and special facilities.

The results of the stepwise regression analyses are shown in Table 54. The best predictor of teacher satisfaction in four of the eight regions was the degree of difficulty that the teacher's lack of ability to improvise materials and equipment offered to effective science teaching. Teachers who did not view this as a problem tended to be more satisfied. Similar variables related to the degree of difficulty that the lack of facilities, lack of supplies and time offered to effective science teaching were significant predictors in two regions each. Again those teachers who did not perceive these as any great difficulty to offering effective science teaching tended to be more satisfied with teaching elementary science. Teachers who were specialists or who were provided with specialist help for teaching science was a significant predictor of teacher satisfaction in three regions. Adequate supplies was a significant predictor in two regions and schools where departmentalization for teaching science was practiced was also a significant predictor in two regions.

It appears as one might predict that teachers who were provided with adequate equipment, supplies, consultant or supervisor help and who felt confident in their knowledge of science and methodology and capable of improvising materials and equipment were the most satisfied sample teachers.

Summary

About 55 percent of the teachers were special science teachers or were provided with special help in teaching science. The correlation and

TABLE 54

SUMMARY OF STEPWISE REGRESSION ANALYSIS FOR PREDICTION OF TEACHER SATISFACTION WITH TEACHING SCIENCE

Region		Variable Number and Abbreviation	Multiple R	R Square	RSQ Change	Simple R
Great Lakes	All Var Free	52 Inabil Improvise Mat	0.36	0.13	0.13	-0.36
N = 536		43 Adequate Supplies	0.42	0.18	0.05	0.31
Farwest	All Var Free	52 Inabil Improvise Mat	0.38	0.14	0.14	-0.38
N = 303		48 Lack Room Fac	0.46	0.21	0.07	-0.33
		68 Indiv Lab	0.52	0.27	0.06	0.25
		02 Departmentalization	0.56	0.32	0.05	0.29
New England	All Var Free	49 Lack Suppl & Equip	0.47	0.22	0.22	-0.47
N = 143		83 Tch Role in Class	0.57	0.32	0.10	0.46
Mideast	All Var Free	44 Adequate Equipment	0.32	0.10	0.10	0.32
N = 453		83 Tch Role in Class	0.42	0.17	0.07	0.32
		59 Lack Time	0.49	0.24	0.06	-0.30
Southwest	All Var Free	52 Inabil Improvise Mat	0.41	0.17	0.17	-0.41
N = 203		59 Lack Time	0.50	0.25	0.08	-0.38
Rocky Mountains	All Var Free	60 Lack Inserv Opp	0.40	0.16	0.16	-0.40
N = 107		53 Lack Sci Knowledge	0.51	0.26	0.10	-0.39
		10 Ident Stds Inc Sci	0.58	0.33	0.07	0.27
		43 Adequate Supplies	0.62	0.39	0.50	0.36
Plains	All Var Free	49 Lack Suppl & Equip	0.38	0.14	0.14	-0.38
N = 279		52 Inabil Improvise Mat	0.44	0.19	0.05	-0.35
Southeast	All Var Free	48 Lack Room Fac	0.30	0.09	0.09	-0.30
N = 598		02 Departmentalization	0.40	0.16	0.07	0.25
Total U.S.	All Var Free	52 Inabil Improvise Mat	0.33	0.11	0.11	-0.33
N = 2622		83 Tch Role in Class	0.41	0.17	0.06	0.29

regression analyses indicated that more likely the teachers were provided with consultant or special help in teaching science rather than being specialists themselves.

The analysis bears out what might be expected. The more satisfied teachers perceived less difficulties to effective teaching. They felt no difficulty in their ability to improvise materials and equipment and in their scientific knowledge. They were also more likely to be provided with consultant or supervisory help than the less satisfied teachers.

Section III

Summary and Discussion

The purpose of this study was to obtain information about procedures, practices, policies and conditions related to the teaching of science in the public elementary schools of the United States in 1971. This report is an attempt to identify characteristics and conditions which are related to the implementation of Science Curriculum Improvement Project materials, selected school programs, materials and practices, relative use of teaching activities, teacher responsibility for and satisfaction with teaching science.

Implementation of Science Curriculum Improvement Project Materials

The overall use of some elementary SCIP materials was 27 percent, but ranged from a low of 21 percent in the Mideast and Southwest regions to a high of 45 percent in the Rocky Mountains region. SCIS, ESS and SAPA constituted the majority of the elementary SCIP materials used with SAPA being used about as much as ESS and SCIS together. This generally held for all regions except the Rocky Mountains region where both SCIS and ESS were respectively used 2 and 3 times more frequently than SAPA. Overall SAPA was being used by about 14 percent of the sample schools.

The regression analyses carried out on the dependent variables regarding the use of any SCIP materials and the use of the three specific SCIP materials indicated that overall the best predictor of the use of SCIP materials was whether the teacher currently or had previously taught SCIP materials. Teacher attendance at a SCIP workshop or institute was also a consistent predictor of the use of SCIP materials. The greater the teacher use of group and individual laboratory activities as a learning activity was also a significant predictor of the use of SCIP materials. The school provision of consultant or supervisory help for the teaching of science was also a significant predictor of the use of any SCIP materials. The school use of SCIS or SAPA materials was a significant predictor of the use of ESS in several regions. A number of other variables were significant predictors of the use of SCIP materials, but not with the consistency across regions and program as the ones cited above.

The best predictor of the teacher currently or previously teaching SCIP materials was whether the teacher had attended a SCIP workshop or institute and the best predictor of the teacher attendance at a SCIP workshop or institute was whether the teacher currently or previously had taught a SCIP. A significant predictor of both of these when the other was restricted from entering the regression analysis was whether the teacher made frequent use of laboratory activities. Teachers making more frequent use of laboratory activities were those who had attended a SCIP workshop or institute and currently or previously had taught a SCIP.

Other School Programs, Materials and Practices

About 80 percent of the schools provided narcotics or drug abuse education, but only about 40 percent provided any health education. About 80 percent of the schools had an environmental or conservation science offering and about half of these schools had special facilities for environmental or conservation science teaching. Most of the schools did not use any special procedures to identify students with an interest in science. The teachers and school relied quite heavily on commercially prepared teaching materials with only about 30 percent of the teachers using some locally prepared materials.

The regression analysis revealed that the best predictor of the school offering of narcotics or drug abuse education was the school offering of environmental or conservation science. The best predictor of the provision of environmental or conservation science was whether special facilities existed for the teaching of environmental or conservation science and whether the school offered narcotics or drug abuse education. As would be predicted, the best predictor of the use of special procedures to identify students with an interest in science was whether the school used any procedures to identify students with special interests and aptitudes. Few other significant relationships were indicated.

Relative Use of Various Learning Activities

Sample teachers made the most frequent use of lecture-discussion activities, followed by science demonstrations and group laboratory activities. There was a great deal of variation in the use of learning activities within each region. The learning activity variables were highly intercorrelated with the relative use of independent study, excursions or field studies, small group discussion and individual and group laboratory activities forming a positively correlated cluster of activities.

The regression analyses indicated that the best predictor of the more frequent use of laboratory activities was whether the teacher currently or previously had taught a SCIP. The more frequent use of excursions or field studies was also a significant predictor of the use of laboratory activities. The relative infrequent use of lecture-discussion learning activities was a significant predictor of the use of laboratory activities in a number of regions.

The best predictor of the teacher frequent use of small group discussion activities was the more frequent teacher use of excursions or field studies and the more frequent use of auto-tutorial instruction. The less frequent use of lecture-discussion activities was also a significant predictor.

The more frequent use of excursions or field studies and of auto-tutorial instruction was also the best predictor of independent study activities.

The best predictor of the more frequent use of excursions or field studies was the frequent use of group laboratory activities and the use of auto-tutorial instruction.

The relative use of science demonstrations although frequently used was not significantly correlated with any other learning activity variables.

Teacher Responsibility for and Satisfaction with Teaching Science

About 45 percent of the teachers were solely responsible for the teaching of science without any outside consultant or specialist help or being a specialist themselves. As would be expected the best predictor of whether the teacher was solely responsible for the teaching of science was whether the school made provisions for consultant or supervisory help for the teaching of science. The regression analysis also indicated that teacher satisfaction was a significant predictor of whether the teacher was solely responsible for the teaching of science. Those teachers who were not solely responsible for the teaching of science were more satisfied with teaching science.

Overall the teachers were between neutral and satisfied with teaching science, being somewhat closer to the satisfied position. The teachers of the Farwest region were the least satisfied and the teachers of the Mideast region were the most satisfied although the differences were not great.

The regression analysis indicated that the best predictor of teacher satisfaction was whether the teacher felt the lack of ability to improvise materials and equipment offered difficulty to effective science teaching. Several other factors related to the difficulty offered to effective science teaching were also significant predictors of teacher satisfaction. In all cases the teachers who did not feel the factors caused any difficulty to effective science teaching tended to be more satisfied with science teaching. The provision of consultant or supervisory help was also a significant predictor of teacher satisfaction. The more satisfied teachers were more likely to be provided with consultant or supervisory help.

A Last Comment

These data provide an estimate of the implementation of elementary Science Curriculum Improvement Project materials; selected school programs, materials and practices; relative use of various teaching activities and teacher responsibility for, and satisfaction with, teaching science: and identifies characteristics and conditions which are related to these.

The data for the 1970 school year is on computer tape and may be used by permission. Inquiries should be sent to Dr. Robert Howe, 244 Arps Hall, The Ohio State University, Columbus, Ohio 43210.

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APPENDIX A

PRINCIPAL'S QUESTIONNAIRE

76/77

THE OHIO STATE UNIVERSITY
CENTER FOR SCIENCE AND MATHEMATICS EDUCATION
244 Arps Hall, 1945 North High Street
Columbus, Ohio 43210

SURVEY OF SCIENCE TEACHING IN PUBLIC ELEMENTARY SCHOOLS
1970-1971

PRINCIPAL'S QUESTIONNAIRE

☐☐ ☐☐☐ ☐☐☐

Principal's Name: ______________________

Name of School: ______________________

Address of School: ______________________
Number Street

____
City County

____
State Zip Code

General Instructions: This questionnaire is to be answered for an individual public elementary school, not for the school system at large. Please check over the questionnaire to get an idea of the scope of questions asked before beginning to fill out the form. Check (√) or fill in every item that applies.

Definition: For purposes of this survey a public elementary school is defined as "an educational institution, operated on public funds, under the principal or head teacher, including any combination of grade levels from K through 8; except any upper grades under a secondary school organization." This definition excludes all private, parochial or diocesean elementary schools, correctional schools, technical or vocational schools, and special schools for the blind, and physically or mentally-handicapped children.

I. SCREENING QUESTION

Is your school a public elementary school according to the above definition? (check one)

☐ Yes (If checked, continue with Item 1 of Section II.)

☐ No (If checked, indicate below what type of school yours is and disregard the rest of the questionnaire and mail it back to us.)

Type of School ______________________

II. SCHOOL ORGANIZATION AND SCHEDULING

1. What is the length of your regular school year? (Number of days classes are in session)

   Number of Days__________

2. Give the enrollment for each grade level in your school as of Fall, 1970. Give also the total school enrollment. If you do not have students in a particular grade level, please leave the corresponding space blank.

Grade Level	Enrollment	Grade Level	Enrollment
K	______	5	______
1	______	6	______
2	______	7	______
3	______	8	______
4	______		

   Total school enrollment __________

3a. Indicate the prevailing way the children are organized for science in your school.

Grade	Standard Grades	Non-Graded
K	____	____
1	____	____
2	____	____
3	____	____
4	____	____
5	____	____
6	____	____
7	____	____
8	____	____

3b. In what grades and for what part of a school year is science taught as a definite part of the curriculum in your school?

Grade	Not Taught At All	Taught Less Than Half Year	Taught Half Year Only	Taught More Than Half Year
Kindergarten	___	___	___	___
First	___	___	___	___
Second	___	___	___	___
Third	___	___	___	___
Fourth	___	___	___	___
Fifth	___	___	___	___
Sixth	___	___	___	___
Seventh	___	___	___	___
Eighth	___	___	___	___

3c. Is your school departmentalized for teaching science at any grade level? (This means the children have a special science teacher at scheduled specified times each week) /_/ Yes /_/ No

If yes, check the grade or grades in your school in which science is departmentalized.

Grade	Departmentalized (Special Science Teacher)	Grade	Departmentalized (Special Science Teacher)
Kindergarten	____	Fifth	____
First	____	Sixth	____
Second	____	Seventh	____
Third	____	Eighth	____
Fourth	____		

IV. TEACHING STAFF

For Item 1 the following definitions apply:

Full-time teachers: those teachers who occupy teaching positions which require them to be on the job on school days, throughout the school year for at least the number of hours the schools in the system are in session.

Part-time teachers: those teachers who occupy teaching positions which require less than full-time service. This includes those teachers employed full-time for part of the school year, part-time for all of the school year, and part-time for part of the school year.

(Substitute teachers, defined as persons employed to teach on a day-to-day basis, temporarily replacing regularly employed teachers, are NOT considered as part-time teachers in this study.)

1. Specify the total number of regularly employed teachers (all grades) in your school.

Sex	Number Of Full-time Teachers	Number Of Part-time Teachers
Male	____	____
Female	____	____

2. Who teaches science to the children in your school? (Check All Boxes Which Apply)

Science Teaching In Your School	K	1	2	3	4	5	6	7	8
A. A classroom teacher with no help from an elementary science specialist or consultant	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. A regular classroom teacher who teaches science classes for other teachers	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. A special science teacher									
1. On the school staff	☐	☐	☐	☐	☐	☐	☐	☐	☐
2. From central office staff	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. A classroom teacher with help of elementary science specialist or consultant									
1. On the school staff	☐	☐	☐	☐	☐	☐	☐	☐	☐
2. From central office staff	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Educational Television Science Programs Available	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Other (Specify) ______ ______	☐	☐	☐	☐	☐	☐	☐	☐	☐

V. SCIENCE BUDGET

1. Does your school have an annual budget for the purchase of new science equipment (excluding books)? ☐ Yes ☐ No

   If yes, total amount of money spent or committed for 1970-71. $________

2. Does your school have an annual budget for the purchase of consumable science supplies such as chemicals, batteries, balloons (excluding books)? ☐ Yes ☐ No

   If yes, total amount of money spent or committed for 1970-71. $________

3. Are your elementary teachers who teach science permitted to purchase equipment and supplies periodically throughout the school year? ☐ Yes ☐ No

4. Have you remodeled science facilities in your school with money from the National Defense Education Act (NDEA)? ☐ Yes ☐ No

   If yes, has this been since September 1968? ☐ Yes ☐ No

5. Have you used money from the National Defense Education Act (NDEA) to purchase science equipment? ☐ Yes ☐ No

   If yes, has this been since September 1968? ☐ Yes ☐ No

6. Have you used money from the Elementary and Secondary Education Act (ESEA) to purchase science equipment? ☐ Yes ☐ No

   If yes, has this been since September 1968? ☐ Yes ☐ No

7. Equipment is defined as non-consumable, non-perishable items such as microscopes, scales, models, aquariums, etc.
   Supplies are defined as perishable or easily breakable materials that must continually be replenished such as chemicals, dry cells, glassware, electric bulbs, copper wire, etc.

   To what extent are equipment and supplies for science demonstrations and experiments available in your school? (check one only for each level)

	Completely Lacking	Inadequate	Adequate
Supplies			
K	☐	☐	☐
1-3	☐	☐	☐
4-6	☐	☐	☐
7-8	☐	☐	☐
Equipment			
K	☐	☐	☐
1-3	☐	☐	☐
4-6	☐	☐	☐
7-8	☐	☐	☐

8. What is the practice regarding the adoption of science textbook series? (check one box for each grade group in your school)

	K	1	2	3	4	5	6	7	8
No science textbook series adopted									
Single science textbook series adopted									
Two or more science series adopted									

9. In what type of room is science predominately taught in your school? (check one box for each grade level in your school)

Type of Room	K	1	2	3	4	5	6	7	8
A. Regular Classroom									
1. With no special facilities for science									
2. With special facilities for science									
B. Special room to which children go for science									
C. Other (specify) ____________									

VI. COURSE OFFERINGS

1. Please specify the total number of children in your school by grade level(s) which use any Science Course Improvement Project materials during the 1970-71 school year. If particular course materials are not used in your school, please leave the corresponding spaces blank.

Science Course Improvement Project	Number of Children by Grade Level								
	K	1	2	3	4	5	6	7	8
SCIS-Science Curriculum Improvement Study (Rand McNally)									
ESS-Elementary Science Study (McGraw-Hill)									

1. (Continued)

Science Course Improvement Project	Number of Children By Grade Levels								
	K	1	2	3	4	5	6	7	8
AAAS-Science-A Process Approach (Xerox)									
COPES-Conceptually Oriented Program for Elementary Science (New York University)									
CSLS-Child Structured Learning in Science (Florida State University)									
IPS-Introductory Physical Science (Prentice-Hall)									
ISCS-Intermediate Science Curriculum Study (Silver Burdett)									
ESCP-Earth Science Curriculum Project (Houghton-Mifflin)									
ESSP-Elementary School Science Project (Astronomy) (University of Illinois)									
MINNEMAST-Minnesota Mathematics and Science Teaching Project									
IDP-Inquiry Development Program (Science Research Associates)									
TSM-Time-Space-Matter (McGraw-Hill)									
Other (Specify) ________ ________									

2a. Do you use definite procedures in your school for identifying children with special interests, aptitudes or talent in any area of your curriculum?

☐ Yes ☐ No

2b. Do you use definite procedures for identifying children with special interest in science?

☐ Yes ☐ No

3a. Is Environmental and/or Conservation Science taught in your school? ☐ Yes ☐ No

If yes, answer 3b. and 3c.
If no, go to Item 4a.

3b. Is Environmental and/or Conservation Science taught as a separate subject or in relation to other subjects? (Check in the appropriate space for each grade level)

	Grade Level								
	K	1	2	3	4	5	6	7	8
Taught separately	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with science	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with social studies	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with two or more subjects including science	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with two or more subjects not including science	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other (Specify) ______________ ______________	☐	☐	☐	☐	☐	☐	☐	☐	☐

3c. Specify any facilities (such as an outdoor education laboratory, school farm, school forest,...) that are available for teaching environmental and/or conservation science in your school.

____

____

____

4a. Is health taught in your school primarily as a separate subject or in relation to other subjects?

	K	1	2	3	4	5	6	7	8
Taught separately	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with science	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with physical education	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with two or more subjects including science	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with two or more subjects not including science	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other (Specify) ______________ ______________	☐	☐	☐	☐	☐	☐	☐	☐	☐

4b. Is narcotics or drug abuse education taught in your school? ☐ Yes ☐ No

If yes, is it taught primarily as a separate subject or in relation to other subjects?

	K	1	2	3	4	5	6	7	8
Taught separately	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with science	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with health	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with physical education	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with two or more subjects including science	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taught with two or more subjects not including science	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other (specify) ____________	☐	☐	☐	☐	☐	☐	☐	☐	☐

VII. INSERVICE EDUCATION

1a. In addition to assistance from the principal, is there other consultant or supervisory help in teaching science available from within the school system?

☐ Yes ☐ No

If yes, check items below which apply.

☐ General elementary supervisor with only general knowledge of science

☐ General elementary supervisor with special competence in elementary science

☐ Elementary science consultant, supervisor, or specialist

☐ Classroom teacher with special training or competence in science

☐ High school science teacher

☐ Other (Specify)

____

____

If you answered "No" to question 1a, DO NOT answer THIS question.

1b. If consultant help in science is available, to what extent do teachers make use of it? (Consider all types checked in question 1a and check only ONE box for each grade group in your school)

Grade	Rarely or Never (less than once a month)	Occasionally (about once a month)	Very Often (at least once a week)
K	☐	☐	☐
1	☐	☐	☐
2	☐	☐	☐
3	☐	☐	☐
4	☐	☐	☐
5	☐	☐	☐
6	☐	☐	☐
7	☐	☐	☐
8	☐	☐	☐

If you answered "No" to question 1a, DO NOT answer THIS question.

1c. If consultant help is available in your school, to what extent is each of the following ways of working used at each grade group level? Complete every box for grade groups in your school by writing in one of the numbers of the following code:

1 - Rarely or Never Used 2 - Used Occasionally 3 - Used Very Often

Consultant's Ways of Working	Grade Group K	1-3	4-6	7-8
Planning or consulting with teachers	___	___	___	___
Teaching science lessons within classrooms	___	___	___	___
Introducing science units	___	___	___	___
Providing materials	___	___	___	___
Helping plan field trips	___	___	___	___
Evaluation of science teaching	___	___	___	___
Demonstration teaching before teacher groups	___	___	___	___
Organizing or directing teacher workshops	___	___	___	___
Working with small groups of children	___	___	___	___
Other (Specify) ____________	___	___	___	___

2. What are the opportunities teachers in your school have for in-service science education? (check as many boxes as apply for each function)

	Sponsorship				
In-Service Science Education Activity	Local School Level	School System Level	State Level	College Sponsored	Any Other Sponsorship (Specify)
Teachers meetings					
Curriculum development and revision					
Elementary science courses					
Elementary science workshops					
Visitations and demonstration teaching					
Television and radio programs					
Other in-service science education activities (Specify ______ ______ ______)					

END OF PRINCIPAL'S QUESTIONNAIRE

THANK YOU FOR YOUR COOPERATION

APPENDIX B

ELEMENTARY TEACHER QUESTIONNAIRE

THE OHIO STATE UNIVERSITY
CENTER FOR SCIENCE AND MATHEMATICS EDUCATION
244 Arps Hall, 1945 North High Street
Columbus, Ohio 43210

SURVEY OF SCIENCE TEACHING IN PUBLIC ELEMENTARY SCHOOLS
1970 - 1971

ELEMENTARY TEACHER QUESTIONNAIRE

☐☐ ☐☐☐ ☐☐☐

Teacher's Name (Optional) ______________________

Name of School: ______________________

Address of School: ______________________

Number Street

____

City County

____

State Zip Code

General Instructions: This questionnaire is to be answered by the individual elementary school science teacher. Please check over the questionnaire to get an idea of the scope of the questions asked before beginning to fill out the form. Check (✓) or fill in every item that applies.

I. TEACHER CHARACTERISTICS

Check (✓) or fill in the blank.

For Item 1, the following definitions apply:

<u>Full-time teachers</u>: those teachers who occupy teaching positions which require them to be on the job on school days, throughout the school year for at least the number of hours the schools in the system are in session.

<u>Part-time teachers</u>: those teachers who occupy teaching positions which require less than full-time service. This includes those teachers employed full time for part of the school year, part-time for all of the school year, and part-time for part of the school year.

<u>Substitute teachers</u>: those persons employed to teach on a day-to-day basis, temporarily replacing regularly employed teachers. They are <u>not</u> considered as part-time teachers in this study. If you are a substitute teacher, please return this questionnaire to your principal.

1. On what basis are <u>you</u> now employed by the school system?
   Full-time ☐ Part-time ☐

2. Sex: Male ☐ Female ☐ Age in years: ____

3. a) Number of years of teaching experience in an <u>elementary</u> school (include the present school year): ____________

b) Number of years of teaching experience in a secondary school: _____

c) Number of years you have taught any science in an elementary school (include the present school year): _____

d) Number of years at present school system or district (include the present school year): _____

4. Please check the degree(s) you now hold, and specify the major and minor subject matter fields of the degree(s).

Degrees Held	Subject Matter Fields: Major	Minor(s)
B.S. or B.A. /_7	_____	_____
M.S. or M.A. /_7	_____	_____
Ed.D. /_7	_____	_____
Ph.D. /_7	_____	_____
Specialist /_7	_____	_____
Non-degree /_7	_____	_____
Other (specify) /_7	_____	_____

5. Are you now working on a formal degree program? /_7 Yes /_7 No.

If yes, what degree? _____

Major subject matter field _____

Minor subject matter field(s) _____

6. Please specify the number of credits you have in the following areas in either quarter hours or semester hours.

Undergraduate Work	Quarter Hours	Semester Hours
Biological Sciences	_____	_____
Physical Sciences	_____	_____
Earth Science	_____	_____
Mathematics	_____	_____
Science Teaching Methods	_____	_____
Student Teaching in Science	_____	_____
Graduate Work		
Biological Sciences	_____	_____
Physical Sciences	_____	_____
Earth Science	_____	_____
Mathematics	_____	_____
Science Teaching Methods or Science Education	_____	_____

7. If you have attended any sponsored science in-service activities since September, 1968, please indicate the year(s) in which you attended the program in the appropriate column below.

In-service Science Education Activity	local school level	school system level	state level	Sponsorship national level	college sponsored	any other sponsorship (specify)
Teachers' meetings						
Curriculum development and revision						
Elementary science courses						
Elementary science workshops						
Visitations and demonstration teaching						
Television and radio programs						
Other in-service science education activities (specify) ______ ______						

8. If you teach or have taught one or more of the science course improvement projects (e.g., ESS, SCIS, AAAS, MINNEMAST, COPES, TSM, IDP, ISCS, ESCP, CSLS), since September, 1968, please supply the following information about each project.

Science Course Improvement Project	Attendance at Workshop or Institute Yes	 No	Length of Workshop or Institute
______	☐	☐	______
______	☐	☐	______
______	☐	☐	______
______	☐	☐	______

II. SPECIAL SCIENCE FACILITIES AND AUDIO-VISUAL AIDS

1. Check the special science facility or facilities available for your use in teaching science in your elementary school. How much use do you make of each facility that is available?

Special Science Facility	Availability		Usage		
	Yes	No	Rarely or Never (less than once a month)	Occasionally (about once a month)	Very Often (at least once a week)
Auto-tutorial laboratory	☐	☐	☐	☐	☐
Closed circuit television	☐	☐	☐	☐	☐
Computer terminals	☐	☐	☐	☐	☐
Greenhouse	☐	☐	☐	☐	☐
Observatory	☐	☐	☐	☐	☐
Outdoor laboratory	☐	☐	☐	☐	☐
Planetarium	☐	☐	☐	☐	☐
Science darkroom	☐	☐	☐	☐	☐
Science museum	☐	☐	☐	☐	☐
Ventilated animal housing	☐	☐	☐	☐	☐
Weather station	☐	☐	☐	☐	☐
Other (specify) ________	☐	☐	☐	☐	☐
________			☐	☐	☐

2. Equipment is defined as non-consumable, non-perishable items, such as microscopes, scales, models, aquariums, etc.

   Supplies are defined as perishable or easily breakable materials that must continually be replenished such as chemicals, dry cells, glassware, electric bulbs, copper wire, etc.

   To what extent are equipment and supplies for science demonstrations and experiments available in your school (check only one)?

	Completely Lacking	Inadequate	Adequate
Supplies	☐	☐	☐
Equipment	☐	☐	☐

3. Check the audio-visual aids that are available to you in teaching science. How much use do you make of each kind of aid that is available?

Audio-Visual Aid	Availability		Usage		
	Yes	No	Rarely or Never (less than once a month)	Occasionally (about once a month)	Very Often (at least once a week)
Motion picture projector	☐	☐	☐	☐	☐
Filmloop projector	☐	☐	☐	☐	☐
Slide projector	☐	☐	☐	☐	☐
Overhead projector	☐	☐	☐	☐	☐
Opaque projector	☐	☐	☐	☐	☐
Micro-projector	☐	☐	☐	☐	☐
Phonograph	☐	☐	☐	☐	☐
Tape-recorder	☐	☐	☐	☐	☐
Television	☐	☐	☐	☐	☐
Commercial models (e.g., molecular, eye, ear models...)	☐	☐	☐	☐	☐
Commercial charts	☐	☐	☐	☐	☐

III. MISCELLANEOUS

1. What degree of difficulty do the following factors offer to effective science teaching in your school? Complete all boxes using the following code:
   3 - Great Difficulty
   2 - Some Difficulty
   1 - No Difficulty

Factors	Degree
Inadequate room facilities	____
Lack of supplies and equipment	____
Insufficient funds for purchasing needed supplies, equipment, and appropriate science reading materials	____
Lack of community support for science program	____
Inability of teachers to improvise materials and equipment	____
Teachers do not have sufficient science knowledge	____
Teachers do not know methods for teaching science	____
Lack of adequate consultant service	____
Teachers lack interest	____
What science to teach in each grade has not been clearly determined	____
School believes other areas more important than science	____
Not enough time to teach science	____
Lack of in-service opportunities	____
Other (Specify) ____________________	____
____________________	____

IV. ELEMENTARY SCIENCE TEACHING

SPECIAL INSTRUCTION: Section IV, Items 1, 2, 3, 4, 5, and 6 below have been designed to provide information specific to one science class. If you teach only one class of science, such as in a self-contained organization, you may skip directly to item 1 below, and respond to these same items in relation to that class.

IF YOU TEACH MORE THAN ONE SCIENCE CLASS, PLEASE READ THE FOLLOWING BEFORE YOU BEGIN ITEM 1.

The method given below is provided for only those elementary teachers who teach more than one group of science students in organizational patterns such as team teaching, ungraded, departmentalization, traveling teacher, etc.

In order to ensure that the elementary school science classes in this survey constitute a random sample, we request your cooperation in selecting one of your science classes, about which we hope to obtain specific information regarding the science teaching practices.

The method of selecting this science class from all your science classes is outlined below. In selecting a science class for the information needed in Section IV, Items 1-6, of the questionnaire, treat each group of students or unit as a separate class.

A) Order your science classes in numerical order, starting with "1" for the first science class that you teach each day, "2" for your second science class, and so on, ending with your last science class for the day.

B) Please select one of the science classes on your list according to the following selection criteria:

Science Class Selection Numbers

05
03
02
01

a) If the total number of science classes that you teach is greater than or equal to 5, select the 5th science class.

b) If the total number of science classes that you teach is less than 5 but greater than or equal to 3, select the 3rd science class.

c) If the total number of science classes that you teach is 2, select the 2nd science class.

1. a) How many students are in *this class*? ______

b) Grade level(s): ______

c) How many times per week do you usually teach science to *this class*? ______

d) How many minutes per week does *this class* usually receive science instruction? ______

I

2. What pattern of science teaching most aptly describes the approach you use with *this class*?

a) Separate subject ☐

b) Integrated with other subject ☐

c) Incidentally ☐

d) Combinations:
    1) Separate subject and incidental ☐
    or
    2) Integrated and incidental ☐

e) Other (Specify) ☐
____
____

3. Which of the following best describes your role as teacher of *this class*?

a) A classroom teacher with no help from an elementary science specialist or consultant ☐

b) A regular classroom teacher who teaches science classes for other teachers ☐

c) A classroom teacher with help of elementary science specialist or consultant who is:

    1) on the school staff ☐

    2) from central office staff ☐

d) A special science teacher

    1) on the school staff ☐

    2) from central office staff ☐

e) A classroom teacher who coordinates science instruction with educational television ☐

f) Other (Specify) ______________________ ☐
____

4. Please check the kind of room that you use to conduct *this class*.

Laboratory or special science room ☐

Classroom with portable science kits ☐

Classroom with no science facilities or kits ☐

Other (Specify) ______________________ ☐

5a. Please check the kind(s) of curriculum materials and/or textbooks that you use for *this class*.

Single textbook including laboratory manual	☐	Locally prepared materials	☐
Single textbook	☐	Separate laboratory manual	☐
Multiple textbooks including laboratory manuals	☐	Other (Specify) ________ ________________	☐
Multiple textbooks	☐		

5b. Please supply the following information about the textbook(s) and/or curriculum materials used for *this class*. If space is insufficient, please continue on the back of this sheet or attach a separate list.

Title	Publisher	Publication Date

5c. If you are using materials of any science course improvement project (i.e., SCIS, AAAS, ESS, COPES, IDP, ESCP, etc.) in *this class*, please indicate the materials used and the extent to which they comprise the total science program for *this class*.

Name of Science Course Improvement Project	Materials Used		Portion of Science Course for *This Class*			
	Printed	Kits	Less than Half	About Half	More than Half	Total Course
________________	☐	☐	☐	☐	☐	☐
________________	☐	☐	☐	☐	☐	☐
________________	☐	☐	☐	☐	☐	☐

6. With respect to *this class*, rank the three learning activities that you use most often. Use "1" for the most often used activity, "2" for the next most often, and "3" for the third most often used activity. Mark all other activities which you use with a check (✓).

Lecture	____	Individual laboratory activity	____
Lecture-discussion	____	Group laboratory activity	____
Small group discussion	____	In-class written assignments	____
Science demonstrations	____	Excursions or field studies	____
Instructional films	____	Programed instruction	____
Independent study	____	Auto-tutorial instruction	____
Others (Specify)		Televised instruction	____

____

____

7. How satisfied are you with teaching elementary school science?

Very satisfied ☐

Satisfied ☐

Neutral ☐

Dissatisfied ☐

Very dissatisfied ☐

END OF TEACHER'S QUESTIONNAIRE

THANK YOU FOR YOUR COOPERATION

APPENDIX C

TABLE 55. ELEMENTARY SURVEY VARIABLES INCLUDED IN CORRELATION ANALYSIS

APPENDIX C

TABLE 55

ELEMENTARY SURVEY VARIABLES INCLUDED IN CORRELATION ANALYSIS

Variable Number	Correlation Analysis
1	Total School Enrollment
2	Departmentalization for Teaching Science
3	Number of Full-Time Male Teachers
4	Number of Full-Time Female Teachers
5	Annual Budget for Science Equipment
6	Science Equipment Money for 1970-71
7	Annual Budget for Science Supplies
8	Science Supplies Money for 1970-71
9	Ability to Purchase Science Equipment and Supplies During Year
10	Remodeling of Science Facilities with NDEA Monies
11	Purchasing of Science Equipment with NDEA Monies
12	Purchasing of Science Equipment with ESEA Monies
13	Availability of Supplies, K
14	Availability of Supplies, 1-3
15	Availability of Supplies, 4-6
16	Availability of Equipment, K
17	Availability of Equipment, 1-3
18	Availability of Equipment, 4-6
19	Special Procedures to Identify Interests, Aptitudes
20	Special Procedures to Identify Interest in Science
21	Environmental or Conservation Education
22	Special Facilities for Environmental Education
23	Drug or Narcotics Education
24	Consultant or Supervisory Help in Teaching Science
25	Supervisor with General Knowledge of Science
26	Supervisor with Competence in Elementary Science
27	Elementary Science Specialist
28	Classroom Teacher with Competence in Science
29	High School Science Teacher
30	Teacher's Meeting
31	Curriculum Development and Revision
32	Elementary Science Courses
33	Elementary Science Workshops
34	Visitation and Demonstration Teaching
35	Television and Radio Programs
36	Average Enrollment Per Grade
37	Male Teachers Per Student
38	Female Teachers Per Student
39	Total Teachers Per Student
40	Equipment Monies Per Student
41	Supplies Monies Per Student
42	Total Equipment and Supplies Monies Per Student
43	NDEA or ESEA Monies for Remodeling or Purchases
44	Science Textbook Series, K
45	Science Textbook Series, 1

TABLE 55 (Continued)

96	Adequacy of Supplies
97	Adequacy of Equipment
98	Use of Motion Picture Projector
99	Use of Overhead Projector
100	Use of Phonograph
101	Use of Tape Recorder
102	Inadequate Room Facilities
103	Insufficient Supplies and Equipment
104	Insufficient Funds
105	Lack of Community Support
106	Inability of Teacher to Improvise Materials
107	Lack of Science Knowledge
108	Lack of Science Methods
109	Lack of Consultant Support
110	Lack of Teacher Interest
111	Scope and Sequence Undefined
112	Low Importance Placed on Science
113	Insufficient Time
114	Insufficient Inservice Opportunities
115	Number of Students in Representative Class
116	Grade Level
117	Science Periods Per Week
118	Number of Minutes of Science Per Week
119	Single Textbook Including Lab Manual
120	Locally Prepared Materials
121	Single Textbook
122	Separate Lab Manual
123	Multiple Textbooks Including Lab Manuals
124	Multiple Textbooks
125	Lecture
126	Individual Laboratory Activities
127	Lecture-Discussion
128	Group Laboratory Activities
129	Small Group Discussion
130	In-Class Written Assignments
131	Science Demonstrations
132	Excursions or Field Trips
133	Instructional Films
134	Programmed Instruction
135	Independent Study
136	Auto-tutorial Instruction
137	Televised Instruction
138	Satisfaction with Teaching
139	Teach Any NSF Curriculum Projects
140	Attendance at Any NSF Curriculum Project Workshops
141	Teacher's Role in Representative Class
142	Total Hours of Science at University
143	Total Hours Science Student Teaching and Methods at University

TABLE 55 (Continued)

46	Science Textbook Series, 2
47	Science Textbook Series, 3
48	Science Textbook Series, 4
49	Science Textbook Series, 5
50	Science Textbook Series, 6
51	Facilities for Science, K
52	Facilities for Science, 1
53	Facilities for Science, 2
54	Facilities for Science, 3
55	Facilities for Science, 4
56	Facilities for Science, 5
57	Facilities for Science, 6
58	SCIS
59	ESS
60	SAPA
61	Other SCIP
62	Any SCIP
63	Teacher of Science, K
64	Teacher of Science, 1
65	Teacher of Science, 2
66	Teacher of Science, 3
67	Teacher of Science, 4
68	Teacher of Science, 5
69	Teacher of Science, 6
70	Science Textbook Series Adopted in School
71	Special Science Facilities in School
72	Environmental Education Taught in School
73	Health Education Taught in School
74	Drug or Narcotics Education Taught in School
75	Outside Help in Teaching Science in School
76	Non-Graded Organization in School
77	TV Science Programs in School
78	School Type I
79	School Type II
80	School Type III
81	School Type IV
82	School Type V
83	Sex of Teacher
84	Age of Teacher
85	Number of Years of Elementary School Teaching
86	Number of Years of Teaching Any Science
87	Number of Years at Present School
88	Master's Degree
89	Working on Degree
90	Hours of Mathematics at University
91	Attendance at Curriculum Development and Revision, Inservice
92	Attendance at Elementary Science Courses, Inservice
93	Attendanc at Elementary Science Workshops, Inservice
94	Outdoor Laboratory
95	Science Museum

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